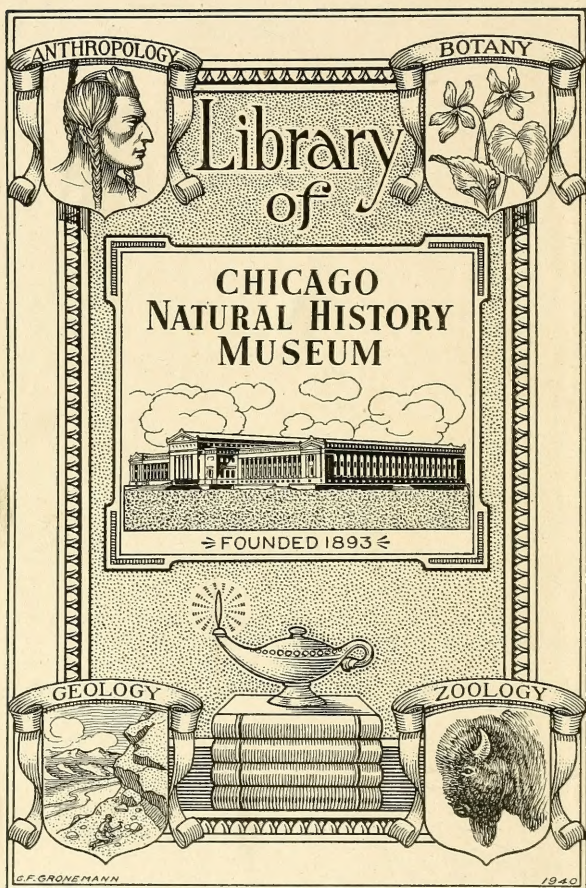




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152 1890-1891

THE SOUTH LONDON

Entomological & Natural History Society

(Established 1872),

Hibernia Chambers, London Bridge, S.E.



OFFICERS AND COUNCIL.

Elected January 28th, 1892.

President.

C. G. BARRETT, F.E.S.

Vice-Presidents.

J. J. WEIR, F.L.S., F.Z.S., F.E.S. R. SOUTH, F.E.S.

Council.

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JOHN T. CARRINGTON, F.L.S.

C. FENN, F.E.S.

F. W. FROHAWK, F.E.S.

J. HENDERSON.

W. H. TUGWELL, Ph.C.

J. W. TUTT, F.E.S.

Hon. Curator.

W. WEST (Greenwich).

Hon. Librarian.

D. J. RICE.

Hon. Treasurer.

E. STEP, The Mays, Ladbroke Road, Epsom, Surrey.

Hon. Secretaries.

* H. W. BARKER, F.E.S., 147, Gordon Road, Peckham, S.E.

A. SHORT.

* *To whom all Communications should be addressed.*

1890-1891

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THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY,

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

The Society has for its object the diffusion of Biological Science, by means of Papers and Discussions, and the formation of Typical Collections. There is a Library for the use of Members. Meetings of the Members are held on the 2nd and 4th Thursday evenings in each month, from Eight to Ten p.m., at the above address. The Society's Rooms are easy of access from all parts of London, and the Council cordially invite the co-operation of all Naturalists, especially those who are willing to further the objects of the Society by reading Papers and exhibiting their Specimens.

SUBSCRIPTION.

*Seven Shillings and Sixpence per Annum, with an Entrance
Fee of Two Shillings and Sixpence.*

All Communications to be addressed to the Hon. Secretary,

H. W. BARKER,

147, Gordon Road, Peckham, S.E.

PAST PRESIDENTS.

| | |
|--------------------------------|-----------------------------------|
| 1872 ... J. R. WELLMAN. | 1882 ... T. R. BILLUPS, F.E.S. |
| 1873 ... „ | 1883 ... J. R. WELLMAN. |
| 1874 ... „ | 1884 ... W. WEST, L.D.S. |
| 1875 ... A. B. FARN. | 1885 ... R. SOUTH, F.E.S. |
| 1876 ... „ | 1886 ... R. ADKIN, F.E.S. |
| 1877 ... J. P. BARRETT. | 1887 ... „ |
| 1878 ... J. T. WILLIAMS. | 1888 ... T. R. BILLUPS, F.E.S. |
| 1879 ... R. STANDEN, F.E.S. | 1889 ... „ |
| 1880 ... A. FICKLIN. | 1890 ... J. T. CARRINGTON, F.L.S. |
| 1881 ... V. R. PERKINS, F.E.S. | 1891 ... W. H. TUGWELL, Ph.C. |

REPORT, 1890.

DURING this year the progress of the Society has not been altogether so satisfactory as in the four preceding years. Thirty-two members have been elected as against forty-four in 1889. The Council, in consequence of the number of members who were in arrear with their subscriptions, considered it advisable to issue a circular calling the attention of defaulting members to the fact that the publication of the Proceedings and other work of the Society was delayed, owing to the want of funds. This appeal was well responded to, but certain members took offence at being asked for their arrears of subscriptions, and consequently the Council have to report the resignations of thirteen members. By death we have lost three members, viz., Mr. A. Bliss, F.E.S., who was at one time Secretary of the Society; Mr. W. B. Farr of Maidenhead, and Mr. Scudder of Southwark.

The number on the books at the present time is 232 members.

Twenty-five meetings have been held during the year, the average attendance being a little over fifty-one.

From the Treasurer's Balance Sheet, it will be seen that the financial position of the Society is very good; but it must be borne in mind that the cost of printing the Proceedings for 1890, and probably a proportion of the expense of the Exhibition to be held in April next, will have to be provided for out of the funds now in hand.

The following additions have been made to the Library:

"The Entomologist's Monthly Magazine" for 1890, from Mr. MCLACHLAN.

"The Entomologist" for 1890, from Mr. LEECH.

"The Zoologist" for 1890, from Mr. NEWMAN.

"The Young Naturalist" for 1890, from Mr. ROBSON.

"The Entomologist's Record," Parts 1 to 9, from Mr. TUTT.

"The Essex Naturalist," from the ESSEX FIELD CLUB.

No. 1 of "The Field Club," from the EDITOR.

"The Garner" for 1890, from Mr. BILLUPS.

"Travels on the Amazon" (A. Russell Wallace), "British Reptiles" (Hopley), from Mr. E. STEP.

"The Entomologist's Annual" for 1870, "Larvæ and Collecting" (Seymour St. John), from Mr. R. ADKIN.

"Hymenoptera of Colorado" (Cockerell), from Mr. JOHN T. CARRINGTON.

Odd numbers of the "Nautilus," No. 9 of the "Canadian Entomologist" and "Hymenoptera of Colorado," from Mr. T. D. A. COCKERELL.

"Larvæ and Collecting" (Seymour St. John), from Mr. HELPS.

"The Insect Hunters" (Newman), from Mr. RICE.

The "Pyralidina," from Mr. J. H. LEECH.

"The Entomologist's Annual" for 1873, from Mr. SOUTH.

"Report of the West Kent Natural History Society," from the SOCIETY.

"Report of the Reading Literary and Scientific Society," from the SOCIETY.

"Science Gossip" for 1890, "The Naked Eyed Medusæ" (Forbes), "Colours of Animals" (Poulton), "European Butterflies" (Lang), "Expressions of the Emotions" (Darwin), "Earthworms" (Darwin),—by PURCHASE.

The Library is still under the able care of Mr. RICE, who has just completed a new Catalogue of the books, which was issued with the Proceedings for 1888-9.

The Society's thanks are due to Mr. ALEXR. GIBB for the gift of a sixty-drawer Cabinet. This handsome present was conditional on the Society paying the charges that would be incurred in having the Cabinet brought from Canada; this the Council readily undertook to do and the charges amounted to £4 16s. 7d.

The Cabinet is now in the Society's rooms, and the members will have ample opportunities of enlarging the collections; Mr. WEST, the Curator, has already commenced to rearrange

these, and donations of insects of all orders will be gladly received by him, as both he and the Council are desirous of making the Collections as representative as possible.

The thanks of members are due both to Mr. RICE and Mr. WEST for the time and attention which they have respectively given to the Library and Collections.

Four Excursions were held, namely :—

May 26—Tilgate Forest, Sussex.

Conducted by Mr. Tugwell, Ph.C.

June 21—Mickleham, Surrey.

Conducted by Mr. C. A. Briggs, F.E.S.

July 26—Leigh, Essex.

Conducted by Mr. Carrington, F.L.S.

September 20—Oxshot, Surrey.

Conducted by Mr. E. Step.

The Council wish to thank Messrs. TUGWELL, BRIGGS, CARRINGTON, and STEP for conducting the various excursions.

H. W. BARKER,

Hon. Sec.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

BALANCE SHEET FOR THE YEAR 1890.

GENERAL FUND.

| <i>Receipts.</i> | | <i>Expenditure.</i> | |
|--------------------------------------|-----------|---------------------------------|-----------|
| | £ s. d. | | £ s. d. |
| To Balance, Dec. 31, 1889... | ... .. | By Rent ... .. | ... .. |
| " Subscriptions and Entrance Fees :— | | Printing ... .. | ... .. |
| Ordinary | 42 11 6 | Postage and Stationery ... .. | ... .. |
| Life Subscription | 5 5 0 | Transfer to Library Fund ... .. | ... .. |
| New | 12 5 0 | " Publication Fund... .. | ... .. |
| Arrears | 5 13 6 | Cabinet ... .. | ... .. |
| | <hr/> | Sundries ... .. | ... .. |
| | 65 15 0 | Cash Balance ... .. | ... .. |
| | <hr/> | | |
| | £102 15 5 | | £102 15 5 |

PUBLICATION FUND.

| <i>Receipts.</i> | | <i>Expenditure.</i> | |
|---------------------------------|---------|-----------------------|---------|
| | £ s. d. | | £ s. d. |
| To Balance, Dec. 31, 1889... | ... .. | By Balance in hand... | ... .. |
| " Vote from General Fund | 4 0 6 |  | ... .. |
| " Donations | 20 0 0 |  | ... .. |
| | 13 2 0 |  | ... .. |
| | <hr/> | | |
| | £37 2 6 | | £37 2 6 |

LIBRARY FUND.

Receipts.

| <i>Receipts.</i> | | | | <i>Expenditure.</i> | | | |
|------------------------------|-----|-----------|-------------|----------------------------|-----|-----------|-------------|
| | £ | s. | d. | | £ | s. | d. |
| To Balance, Dec. 31, 1889... | ... | 3 | 6 11 | By Purchase of Books, etc. | ... | 4 | 12 7 |
| " Vote from General Fund | ... | 5 | 5 0 | " Binding ... | ... | 1 | 10 3 |
| " Library Fines ... | ... | 1 | 3 4 | " Balance in hand | ... | 3 | 12 5 |
| | | <u>£9</u> | <u>15 3</u> | | | <u>£9</u> | <u>15 3</u> |

Assets.

| <i>Assets.</i> | | | | <i>Liabilities.</i> | | | |
|---|-----|----|----------------------|---|-----|-----|----------------------|
| | £ | s. | d. | | £ | s. | d. |
| To Cash Balance, General Fund ... | ... | 31 | 2 10 | By Rent, due Christmas, 1890 ... | ... | 6 | 5 0 |
| " " " Publication Fund | ... | 37 | 2 6 | " " Printing ... | ... | ... | 0 8 0 |
| " " " Library Fund ... | ... | 3 | 12 5 | " " " "Proceedings" (in progress—part only) | ... | 37 | 2 6 |
| " " " Estimated Realisable portion of Arrears | ... | 3 | 15 0 | " " " Balance of Assets over Liabilities | ... | 31 | 17 3 |
| | | | <hr/> £75 12 9 <hr/> | | | | <hr/> £75 12 9 <hr/> |

Compared with Vouchers, and found correct, *January 14th, 1891.*

THOS. W. HALL,
ALBERT J. HODGES, } *Auditors.*

PRESIDENTIAL ADDRESS, 1890.

GENTLEMEN,

With the conclusion of the Society's year of 1890, allow me to thank you for the very kind and generous manner in which you have supported me in the meetings over which I have had the pleasure of presiding. I have, however, the serious regret, that my enforced absence did not permit me to be with you during the latter weeks of the year; and especially that the same reason debars my reading to you to-night the customary Presidential Address.

Tempted by its surroundings of beauty and Entomological associations, I was induced last summer to occupy one of those quaintly old-fashioned houses in Surrey, which were built in the pre-historic times of sanitation; hence my present absence from England in the Riviera, after a sharp attack of typhoid fever.

I am not at all certain, whether I am not to be congratulated on this absence from London, during the rigours of a dreadfully severe winter. Not that one finds in these reputedly warm climes the enervating atmosphere of a sunny south. The cold wave which has so long hung over northern Europe, has, in part, also come southward since the end of the first week of January. For the past week has been seen around these parts, the unusual sight of snow-covered mountains, and that lovely tract of land between them and the sea shore, called the Riviera, white with snow. Date-palms of great size have fronds bending beneath its weight; while orange trees, still laden with fruit, have each leaf decked out with tiny patches of white, much like that joy of our youth, but botanical anomaly, the Christmas-tree. On the sides of the mountains, shrubs of rosemary crop up from among frozen snow, while bearing upon their branches heavy masses of bloom. This plant is here abundantly wild, as is also the lavender. By the sides of country lanes one sees numberless

daisies of gigantic bloom, quite independent of snow, on stalks some two feet in length. These flowers evidently enjoy the brilliant sunlight, though that bitterly keen cold wind, the "Mistral," be blowing through the very bones of human beings; for cold as is the cold here now, it is a clean cold. Not only do we mammals feel the temperature severe almost beyond the death-resisting powers of some of the natives, but certain lepidopterous larvæ, which in England are represented by others of their species, respectably in pupæ, have been killed by the extremes of mid-day heat and midnight frost. This especially applies to *Pieris brassicæ*, which, on the 8th of January, I saw by hundreds in a most forlorn state of death from starvation, after the bitter frosty wind of the preceding night and hot sunshine of that noontide. The mortality was enormous among these larvæ of all sizes, and especially those turning to pupæ on the walls near by; but those already in pupa seemed in no way injured. A few days later on one of these walls was a curious sight of dead and shrivelled larvæ by hundreds. In exposed places also are numerous nests of the processionary moth larvæ, all dead. Perhaps this unusual severity of weather may be of ultimate advantage to both the insects and to mankind, by reducing the numbers of these abundant species which are so very common here. The nests of *Bombyx processionea* occur in most of the pine trees of the various kinds found in the Riviera. On one small pine in a garden adjoining the house where I am staying, near Cap Brun, on the shore of the Mediterranean Sea, are no less than fifteen nests, which at a little distance appear in the sunshine like so many soda-water bottles hung out to dry. This species also affects the stunted pines at an elevation of 3,000 feet above the sea.

Like other South European races, the inhabitants of Provence are strictly utilitarian in the use of nearly all animals for food. Nothing comes amiss, excepting perhaps magpies and lizards. An Englishman feels shocked on seeing piles of dead birds exposed for sale in the markets, few larger than thrushes, while the most common are robins, goldfinches, and others, down to wrens in size. Such is the daily exhibi-

tion during winter. On the morning of Christmas Eve, I estimated that there were offered in the market of Toulon alone, no less than three thousand blackbirds and thrushes, with perhaps three thousand other birds of less size. Jays are eaten, as are occasionally rooks, which are very rare here. This habit of consuming, for food, everything possible, extends equally, among the people, to the denizens of the sea. Octopus and sea-urchins are counted dainties to be served even at the tables of the rich.

It is interesting here to see the ripe fruits on some plants which rarely fruit in England, such as various Eucalypti, bay-trees, lilacs, laurels, *Euonymus japonica*, *laurustinus* and others.

Of butterflies, since my arrival at the end of November, on sunny days there were many, up to the early days of this year, chiefly *Vanessidæ* and *Colias edusa*. I saw one of these latter in the noonday sun flying by the side of a pine-wood, while the snow was white on the ground in shaded places.

Before concluding this letter to you all, I should be wanting in gratitude to my friends who have assisted me in the Council, if I did not acknowledge the uniform courtesy of my Officers and Councillors, and their great energy on behalf of the well-being of the Society's affairs during the past year. My thanks are also due to the Vice-President, who has so kindly occupied the chair at your meetings during my enforced absence. I have only to add that I wish our Society a prosperous future ; and I look forward to being with you at an early meeting, when I hope for the rest of the year to give such aid towards that prosperity as may be within my power.

I am, Gentlemen, faithfully yours,

JOHN T. CARRINGTON.

ABSTRACT OF PROCEEDINGS.

JANUARY 9th, 1890.

T. R. BILLUPS, Esq., F.E.S., *President*, in the Chair.

Messrs. T. Grover, F. H. Atkinson, and C. F. Johnson were elected members.

Mr. Billups exhibited *Andrena nigro-æna*, Kirb. and its internal parasite Stylops, taken at Dulwich, June, 1889; and a living series of *Andrena clarkella*, Kirb. and its rare parasite *Nomada borealis*, Zett., dug from its nidus on the 6th inst. in the neighbourhood of Hastings, by Mr. Bennett, one of the Society's country members.

Mr. Jenner Weir exhibited specimens of *Hesperia lineola*, Ochs. (the new British butterfly discovered by Mr. Hawes), which he had obtained many years ago, but was not certain whether in Kent or Sussex; and a Sussex specimen of *Hesperia thaumas*, Hufn., which bore a very close resemblance to *H. lineola*, and could only be distinguished from that species by the light brown tips to the antennæ, which in the latter were black. For comparison he showed undoubted *H. thaumas*, British, and *H. lineola*, from Chamouin.

Mr. Hawes, who was the first to notice this butterfly in Britain, also exhibited the specimens taken by himself, and remarked that it was quite by accident that he met with the species, which was undoubtedly distinct from *H. thaumas*. Being in want of a series of the latter for his collection, in July, 1888, he caught a good number, and on reaching home he noticed that three of those taken were different to the others; and on reference to the European collection at the British Museum, it was ascertained that they were *H. lineola*—a species not hitherto recorded as occurring in Britain. Owing to its close resemblance to *H. thaumas*, there was little doubt that it had been overlooked in this country. The chief point of distinction was found in the coloration on the under side of the antennæ. In *H. thaumas* this was of a faint buff, while in *H. lineola* it was a decided black.

Mr. Carrington remarked that he thought all would congratulate Mr. Hawes in adding a butterfly to the British list—it was a privilege that fell to the lot of very few. When Mr.

Hawes first called his attention to the species, he at once went through a long series of *H. thaumas*, taken by himself in 1889 at a locality nearly twenty miles from where Mr. Hawes obtained his, and he had found three of the new species among them. There was but little doubt, therefore, that the species was of general occurrence, but had been overlooked owing to the close resemblance between the two species. It would appear from Mr. Hawes' observations that *H. lineola* was a little later in appearance than *H. thaumas*, as the majority of the latter species were worn when the former was beginning to emerge. The new species was found throughout Northern Asia, Europe, and the Mediterranean district.

Mr. R. Adkin exhibited a variable series of *Hybernica defoliaria*, Clerk., and a series of *Nepticula fulgens*, the latter received from Mr. Vine, of Brighton.

Mr. South exhibited specimens of *Peronea sponsana*, Fb., taken at Haslemere, which were of the same form as those exhibited by Mr. Adkin at the previous meeting. They were, however, not quite so strongly marked as the majority of Mr. Adkin's, which were from the New Forest. Mr. South remarked that according to Mr. Wilkinson, var. *reticulana*, Haw., differed from the type in having the primaries faintly reticulated, var. *tristana*, Haw., was smaller, but otherwise similar to the type, while var. *lividana* of Treitsche was unicolorous.

Mr. Legros exhibited skulls of several of the smaller mammalia.

Mr. Carrington exhibited several small branches of the sallow in full bloom, which, he stated, were gathered at Bournemouth from a tree growing in the open air. Several members contributed the result of their observations on the forwardness of different species of plants owing to the abnormal mildness of the weather.

The Secretary read a letter from Mr. F. E. Strong, who, writing from Melbourne on the 14th November last, stated that about three weeks prior to the date of his letter, Williamstown was invaded by a vast swarm of moths, which came into the houses and churches, and the sea was literally covered with their dead bodies. When these were washed up by the waves they formed a long line, over a mile in length, averaging about a foot in breadth and about four inches deep. They appeared to be all of one species. The matter had been discussed in the Melbourne papers, but without any satisfactory explanation being arrived at.

JANUARY 23rd, 1890.

T. R. BILLUPS, Esq., F.E.S., *President*, in the Chair.

Messrs. G. A. Lewcock, P. Bright, and W. Gardner were elected members.

This being the Annual General Meeting, the evening was devoted to receiving the reports of the Council and Officers, and the election of Officers and Council for the year.

President: Mr. John T. Carrington. *Vice-Presidents*: Mr. W. H. Tugwell, Ph.C., and Mr. J. Jenner Weir, F.L.S., F.Z.S., F.E.S. *Hon. Treasurer*: Mr. E. Step. *Hon. Curator*: Mr. W. West. *Hon. Librarian*: Mr. D. J. Rice. *Hon. Secretaries*: Mr. H. W. Barker, F.E.S., and Mr. D. J. Rice. *Council*: Messrs. R. Adkin, F.E.S.; C. G. Barrett, F.E.S.; T. R. Billups, F.E.S.; C. A. Briggs, F.E.S.; T. W. Hall, F.E.S.; R. South, F.E.S.; and J. R. Wellman.

FEBRUARY 13th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

The President announced that Mr. A. Bliss, who was, at one time, Hon. Secretary of the Society, died on the 29th January. A resolution was passed, expressing sympathy with his widow and relatives.

Mr. C. G. Barrett exhibited a very pale variety of *Hesperia lineola*, Ochs., taken by Mr. H. W. Vivian in Cambridgeshire, flying with specimens of *H. thaumas*, Hufn., a specimen of *Epischnia banksiella*, taken at Portland, and recently named and described by Mr. Nelson Richardson, and a specimen of *Retinia margarotana*, H.-S., a species new to Britain, found in the collection of Mr. J. B. Hodgkinson, and ascertained to have been taken in the North of England along with *Retinia pinivorana*, Zell.

Mr. C. G. Barrett also exhibited a long series of *Phycis adornatella*, Tr., from various localities, and remarked that some fifteen or twenty years ago, Professor Zeller expressed the opinion that there were two distinct species, the second being known as *subornatella*, Dup. Although the markings of the two were very much alike, in the western specimens, which were recognised as *subornatella*, there was a slight difference apparent in the length of the wing, and in the forewing there was an indistinct fascia of white scales, this in fact became one of the distinguishing characteristics. In the course of time specimens of this form were obtained from many localities, including the Isle of Man, the East and West

of Ireland, Perthshire, and Pembrokeshire; and of the *adornatella* form from Box Hill, Reading, Folkestone, he thought from Norfolk and many other localities, mostly on the chalk. Mr. Nelson M. Richardson had now discovered both forms occurring together, in the Isle of Portland, with intermediate variations; there could therefore no longer be any doubt that both forms were referable to one species, the correct name of which would be *dilutella*, Steph.

Mr. South said that he used to find and breed *adornatella* in North Devon. When he came to London he found *subornatella* going the rounds, he compared his specimens with some of these, and was under the impression that they were identical; his attention was called to the white fascia, and he found that several of his specimens of *adornatella* had indications of this. In 1882 he was again in North Devon, and caught the species in numbers, and among them were specimen with the white fascia fully developed; he was very pleased to find that authors were agreed that *subornatella* was only a form of *adornatella*.

Mr. Tutt stated that at Cuxton, Kent, he had obtained every possible variety, some with the perfect white fascia, in others it was entirely wanting; he had never been able to separate the two forms, and had no doubt that Mr. Barrett was right in putting the two together.

Mr. Barrett pointed out that the females were nearly always darker; and Mr. Adkin remarked that most members who had collected at Box Hill, would remember that both forms occurred there; but there was some distance in time between the appearance of those having the white fascia and those without it; this had been thought to be one reason for considering the two distinct, Mr. Barrett's remark probably solved this difficulty.

Mr. W. H. Tugwell exhibited *Spilosoma lubricipeda*, Esp., from York, and remarked on its variation, expressing an opinion that few other places in England produced the form of variation which he exhibited. A few of the extreme West of Cornwall specimens showed a tendency to this type, but not so pronounced as those from York.

Mr. Tutt exhibited photos of varieties of *Arctia caia*, L., *A. villica*, L., *Spilosoma lubricipeda*, Esp., and *Abraxas grossulariata*, L., taken from the collection of M. Oberthur, Rennes.

Mr. H. Moore exhibited a collection of Lepidoptera and Coleoptera from the coast of Labrador.

Mr. Jenner Weir called attention to several of the Lepidoptera, among them being a specimen of *Polyommatus phlæas*, L., a species he would not have expected to occur at Labrador.

Mr. Lewcock exhibited larvæ and imagines of *Mezium affine*, Boield., and remarked that he had fed the larvæ on pupæ of *Arctia caia*, L.

Mr. Carrington exhibited a specimen of the Blind-worm or Slow-worm (*Anguis fragilis*, L.), found sunning itself on a common near East Grinstead, during the week.

Mr. Jenner Weir said it was exceedingly early to find the species, as it did not generally appear before May. Mr. Step stated, however, that he generally saw them out the first warm and sunny day after Christmas.

Mr. R. Adkin exhibited cast skins of the Great Water Newt (*Molge cristatus*, Laur.), and remarked that the entire skin was thrown off and left floating in the water, showing the whole shape of the reptile, even to the paws and the head; he had noticed a very large number of minute teeth on the palate.

Mr. Step said that it was well known that the group of amphibians to which the newt belonged had immense numbers of minute teeth on the edge and roof of the mouth; also that the newt cast its skin during the summer. Miss Hopley had shown him a long series of skins which she had mounted so successfully that they gave one the impression that they were prints of the reptile; she had told him that when the skin was floating in the water, she slipped a piece of note-paper underneath, and carefully arranged, with a camel-hair pencil, the different parts, and then took the paper out of the water and dried it.

Mr. Weir observed that it was curious that this group did not eat the discarded skin, as the toads did. The process of mounting the skins was the same as that adopted with seaweeds. Miss Hopley had also mounted the skins of a number of lizards in the same way.

Mr. M. H. Winkley said the Salamander (*Salamandra maculosa*) always ate the discarded skin.

Mr. Carrington, referring to the mildness of the season, remarked that on the 20th instant, at Chelsea, he saw an almond tree in bloom; he had never before seen them in bloom so early in the year.

Mr. Tugwell said that at Greenwich they were not in bud, and Mr. R. Adkin observed that at Lewisham the buds were just breaking.

Mr. Kenward recorded taking a specimen of *Hybernica marginaria*, Bork., on the 2nd January.

The President made some observations and suggestions for improving the meetings; in the course of which he remarked that he thought it desirable that more attention should be

paid to Botany. He had talked the matter over with Mr. Step, who had been kind enough to say that during the season he would exhibit and make some remarks on the various wild flowers he might meet with. He also suggested that when out on Entomological expeditions, members should gather what shells they met with and hand them to those who studied this branch of Natural History, for naming and exhibition; he also thought it desirable that Ornithological exhibits should be more frequently made; the Arachnida too offered a good opening for members to distinguish themselves, as the group was but little worked. Mr. Carrington concluded by expressing the hope that country members would forward specimens for exhibition, also records of the occurrence in their district of rare and local species of all orders, and notes and observations relating to the subjects studied by the Society.

FEBRUARY 27th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Messrs. W. Smith, W. Bloomfield, and G. A. Farini were elected members.

Mr. T. R. Billups, on behalf of Mr. T. D. A. Cockerell, exhibited Galls collected at West Cliff, Colorado, U.S.A., and read the following note by Mr. Cockerell:—

“The galls now exhibited were all collected on a strip of land about a quarter of a mile long, close to West Cliff. The rose galls are of three species. The smooth round galls are those of *Rhodites ignata*, Osten-Sacken, from which, however, an abundance of a parasitic Cynipid, *Periclistus pirata*, Osten-Sacken, will be bred. The irregularly-shaped rough galls belong to *Rhodites fusiformans*, new species. The little blister-like galls on the leaves will produce *Rhodites rosæfoliæ*, Cockerell. Of the willow galls, the reddish fusiform ones produce *Cecidomyia salicis-siliqua*, Walsh. The bud-galls are those of *Cecidomyia salicis-strobiloides*, Osten-Sacken. From these galls many Chalcids, including some new species, will be reared, in addition to the gall-makers.”

Mr. Cockerell also forwarded lepidopterous ova found at the same place as the galls, which would produce larvæ of *Clisiocampa californica*, Packard, a species allied to *C. neustria* of England. The larvæ might be fed on *Salix*, *Populus*, or *Ribes aureum*. The eggs sent were found on willow.¹

¹ These eggs produced larvæ, which commenced to feed on willow, but most died at the first moult, and the rest soon afterwards. The food was evidently unsuitable.—H.W.B.

Mr. Bloomfield exhibited two specimens of *Hesperia lineola*, Ochs., found by him in his series of *H. thaumas*, Hufn., taken in Essex.

Mr. T. R. Billups exhibited *Meopus trispinosus*, Wat., a very curious three-spined weevil from New Zealand, *Poroppleura monstrosa*, Olivr., from Brazil, belonging to the family *Cryptocephalidæ*; also specimens of the Colorado Potato Beetle (*Doryphora decem-lineata*, Say.), and said that this destructive creature became a perfect beetle within a month from the hatching of the eggs, which were of a yellow colour; the larvæ were pale yellow with a reddish tinge, and a lateral row of black dots. Messrs. Walsh and Riley, the editors of the American *Entomologist*, had stated that there were three broods of the species every year in North Illinois and Central Missouri, each of which went underground to pass into the pupa state; the first two broods came out of the ground in the perfect state about ten or twelve days afterwards; the third brood staying under ground all the winter, and emerging late in the following spring, just in time to lay eggs upon the young potato leaves, which were devoured to such an extent as to almost destroy the entire crop in some localities. It had various and numerous enemies, which preyed upon it in the larval stage, such as beetles, Hemiptera, and also certain species of Diptera. A dry hot summer was most injurious to the pupæ, as they died in consequence of the want of moisture in the soil; but the most efficacious remedy against this pest was found to be hand-picking. Another closely allied species, *Doryphora juncta*, Gesmar., an inhabitant of the Western and Southern States, was not so destructive, as it fed on the wild potato, not eating the cultivated species. Mr. Billups also exhibited a species of *Conocephalus*, of the family of Locustariæ, Latreille, from tropical Australia.

Mr. Watson exhibited a nest of a species of Mantis (made among the roots of various plants), also two living examples of the Mantis, and remarked that the nest had been sent to him from Sydney, where the species was said to occur freely. Besides the two specimens now alive, many others had emerged during transit; the box arrived in London about a fortnight previous to the meeting, and the two specimens shown had emerged three days before. Mr. Billups stated that the species was *Mantis religiosa*, Latr.

Mr. Skinner exhibited an example of a locust *Acridium migratorium*, Fab., taken by himself in the Wandsworth Road on the 18th instant.

Mr. C. H. Collings exhibited a Hymenopteron parasitic on a

species of the genus *Aphis*, and read the undermentioned note :—

“ I should mention that at my home we have a gr  enhouse and a fern-house, continuous with one another. Under the sloping roof of the fern-house, several large fuchsia plants are trained, shading the ferns beneath. The green flies, at certain times of the year, simply swarm over leaves and flowers alike. My father endeavours to keep these pests in check by occasionally ‘smoking’ the fern-house; but they soon multiply, and in a short time their numbers are as great as before. Last year, however, in July, he noticed that he was not altogether unaided in his somewhat hopeless war of extermination. Running about on the leaves of two different kinds of orchids—*Oncidium macranthum* and a species of *Anthurium*, kept in the adjoining greenhouse, he noticed several very small black flies. He had noticed previously many somewhat inflated, glistening, hard and empty skins of green flies fixed firmly to the fuchsia leaves. On my attention being called to these smaller flies, I saw at once that they were Ichneumons. To make sure whence they came, I enclosed a number of fuchsia leaves and flowers, infested with green flies, in a box. Result : shrivelled leaves and flowers, dead aphides, and a series of ichneumons, which, together with a few hardened skins similar to those just described, I mounted on card, and show to-night under the microscope. One ichneumon only comes out of each green fly. The ichneumons themselves are very pretty, both in form and colour; the latter is a combination of black and yellow markings. As to their precise name, I consulted Mr. Kirby at the British Museum. He told me that they almost certainly belonged to the genus *Aphidius*, of sub-family Aphidid  —this in turn belonging to the Braconid  .”

Mr. E. Step, referring to Mr. Carrington’s observations at the previous meeting, exhibited *Arum maculatum*, L., which he said was commonly known as the Cuckoo-pint, Wake Robin, or Lords and Ladies. The leaves were generally spotted; but in the examples shown it would be noticed they were entirely without spots. There were two species found in this country; the other one known as *A. italicum*, Mill., occurring only in the Isle of Wight. They belonged to the order Arace  . The majority of the plants were poisonous, although from them arrow-root, sago, and tapioca were obtained. At one time a drink called saloup was made from the roots of the Arum. Mr. Step then gave a description of the plant, the inflorescence and the process of fertilization by insects.

Mr. Tugwell said saloup, or salep, used to be made from

the tubers of several species of orchis, as *O. muscula*, *O. pyramidalis*, and *Habenaria bifolia*; he had never heard of its being made from Arum roots.

The meeting closed with a Microscopical Exhibition, Mr. C. H. Collings exhibiting the ichneumon before referred to. Mr. Billups ovipositor of *Biston hirtaria*. Mr. R. Adkin antennæ of the male of *Pygæra bucephala*. Mr. W. West ovaries of house-fly and head of *Tænia solium*. Mr. Cameron diatoms, tongue of *Apis mellifica*, proboscis of *Musca domestica*, etc.

MARCH 13th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Messrs. A. E. Peake and E. W. Sinclair-Cox were elected members.

Mr. T. R. Billups exhibited a specimen of *Ichneumon Haglundi*, Holmg., a species new to Britain, bred by Mr. R. Adkin from a larva of *Spilosoma fuliginosa*, L., received from Scotland; also a series of *Apanteles emarginatus*, Nees., bred from *Gracilaria omissella*, Dougl., by Mr. Elisha. Mr. Billups said that there appeared to be no records of this species having been bred before in this country from any of the family Gracilariidæ; but according to Reinhard, it had been bred in Germany from *Gracilaria rufipennella*, Hub., and *G. Fribergensis*, Fritzsche.

Mr. V. Gerrard exhibited living larvæ and pupæ, with set examples of the imago of a species of *Ephestia*, discovered by him in some old samples of rice. At present he was unable to say where the samples originally came from, as in the lot he looked through there were some from Japan, Java and Burmah respectively. He had, however, written to the merchants in Hamburg, through whom the rice came, for particulars as to whether the larva occurred commonly in rice samples; and if so, inquiring the place or places from which it came. It was suggested that the species was *E. kuhniella*, Zell.

Mr. Mansbridge exhibited imagines and living larvæ of a species of *Tinea* feeding in samples of fish guano, and said that the guano was brought from Brettesnaes, on the N.W. coast of Norway, and was composed of the flesh and bones of small cod and herrings from which the oil had been pressed. The larvæ inhabited a tube or gallery, which was formed of particles of the food united with silk. In all the examples seen these galleries were beneath the surface, but

before pupating the larvæ worked their way upwards, and pupated just below the surface. Mr. Tutt expressed an opinion that the species was *Tineola biselliella*, Hml.

Mr. R. Adkin exhibited a series of *Mania typica*, L., and said that the larvæ from which they were reared were found in his garden at Lewisham, feeding gregariously on a leaf of scarlet geranium last autumn. They were brought into a warm room and supplied with dock leaves, on which they soon fed up, and the majority of them pupated in November, the imagines appearing in January and February of the present year. He had found a similar method of forcing the larvæ of some of the *Triphæne* that he had tried equally successful, and he believed that many other species of Noctuæ whose larvæ hybernated might be similarly treated with good results, providing, of course, that they could be induced to take such foods as might be obtained during the winter months. It had been suggested that the unduly rapid feeding-up of the larvæ tended to produce undersized imagines; it did not however appear that such was the case in this instance. It had been further stated, and indeed had been conclusively proved with regard to double-brooded species showing seasonal dimorphism, that the lengthening or shortening of the duration of the pupal stage affected the tone of colour of the imago; but this again was here inoperative, for although the time occupied in the complete metamorphoses was considerably shortened the duration of the pupal stage was not materially affected, the size and colour of the insects exhibited agreeing well with examples reared under natural conditions.

Mr. Tutt exhibited typical specimens of *Agrotis obelisca*, Hb., from Germany, the variety *hastifera*, Donz., from Hungary, and some picked specimens captured by Mr. A. J. Hodges in the Isle of Wight, of a different type to the var. *hastifera*, but much nearer that than the typical *obelisca*.

Mr. West (Greenwich) exhibited a small collection of Coleoptera made by Mr. Rydes at Columbia.

Mr. Billups exhibited a specimen of a Hemipteron of the genus *Pentatoma*, taken alive in the Boro' market from a package of bananas from the West Indies; a species of *Chrysomelidæ*, found alive in a barrel of grapes from Malaga, and a fine female of *Bombus latreillellus*, Kirby, found in a hamper of lettuce from the south of France. Mr. Billups also exhibited *Testacella haliotideæ*, Drap., and made some remarks upon the habits and economy of this interesting and useful slug.

Mr. E. Step exhibited *Ruscus aculeatus*, L., which he said was a common plant within certain limits; in the counties south and west of Norfolk he believed it was pretty well distributed, but occurred very sparingly, and in most places was a local plant. After describing the plant at some length, Mr. Step said he used to find it sparingly on Wimbledon Common; but he now found it exceedingly common at Epsom, and the woods about Ashstead, Surrey, where it was always associated with holly. He did not know whether there was anything peculiar to the growth of holly which made the soil specially suitable for the growth of the plant now being discussed.

Mr. Carrington and Mr. Tugwell both remarked that it occurred freely in various localities where holly was not present.

Mr. Skinner exhibited plants of colt's-foot (*Tussilago farfara*, L.), and Mr. Step gave a short description of it.

Mr. Carrington stated that it was an interesting plant to Entomologists as being the food-plant of *Platyptilia gonodactyla*, Schiff., one brood of which fed in the stems and the other in the flowers.

Mr. Stringer exhibited a fungus, which Mr. Step said was *Phallus impudicus*, L., and, owing to its unpleasant smell, was popularly known as the Stink-horn; the species was sometimes so common in the woods, as to render it extremely unpleasant to be in their vicinity.

MARCH 27th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Mr. Billups exhibited several species of Ophionides, bred by members of the Society. Amongst others, *Paniscus testaceus*, Gr., *Paniscus cephalotes*, Holmgr., and *Ophion luteum*, L., bred by Mr. Barker from the larvæ of *Dianthæcia capsicola*, Hb., the latter species also being reared by Mr. Wellman from *Hadena pisi*, L., and from *Toxocampa craccæ*, Fb., by Mr. South. Mr. Billups called particular attention to the fact that the cocoons of *Ophion luteum* differed considerably, according to the host from which bred, no two cocoons being alike. Mr. Billups also called attention to the extreme variability in size of *Paniscus cephalotes*, two females taken by himself at Hayling Island in 1866 being not above one-third larger than the female bred by Mr. Barker from *Dianthæcia capsicola*. In the same box were exhibited

Banchus moniliatus, Holmgr., bred from the larvæ of *Panolis piniperda*, Panz., both sexes of *Exetastes osculatorius*, Fab., from the larvæ of *Retinia pinicolana*, Dbl., by Messrs. Adkin and South.

Mr. Billups also exhibited specimens of *Pimpla scaniea*, Vill., bred by Mr. Adkin from Scotch larvæ of, he believed, *Euchromia arbutella*, L., and remarked upon the extremely small form of the male, while the female was excessively large.

This gentleman also exhibited a specimen of the family Pimplidæ, a female of the very rare *Xylonomus præcatorius*, Fab., with pupæ case from which bred, found in his own garden at Dulwich, June 1st, 1889. In addition, he exhibited *Phygadeuon sodalis*, Tasch., taken in his garden, June 1st, 1889; also a female of *Hemiteles macrurus*, Tasch., taken in the same locality, August 16th, 1889: both these species of Ichneumonidæ being new to Britain. *Phygadeuon* (*Microcryptus*, Th.) *rufoniger*, a species new to science, being one of several females taken by Mr. Billups in Ashdown Forest on November 10th, 1885, by cutting up roots of grass, etc. This species had been described by Mr. Bridgman in the *Transactions of the Entomological Society* for 1889, p. 415.

Mr. C. G. Barrett exhibited a specimen of *Botys mutualis*, Zell. (a native of Asia and Africa), taken by Mr. Gregson some years ago in Lancashire, doubtless accidentally introduced. He also exhibited *Dianthæcia carpophaga*, Bork., *D. capsophila*, Dup., a specimen of *D. Barrettii*, Dbl., all reared by Mr. Blandford from larvæ found in South Wales.

Mr. Barrett stated that for over thirty years *capsophila* and *carpophaga* had been generally considered as distinct species, though not by all Entomologists. Mr. Blandford had recently collected a number of larvæ in South Wales, and from these he had bred pretty well all the intermediate forms, and thus had furnished evidence which had compelled him (Mr. Barrett) to the belief that *capsophila* was only a variety of *carpophaga*. With regard to the specimen of *D. Barrettii*, Mr. Barrett remarked that he thought it was the first specimen that had been reared in this country.

Mr. Tugwell expressed an opinion that *D. Barrettii* was an internal feeder and allied to the genus *Luperina*; he also thought Mr. Blandford's specimen was smaller than Irish examples. Mr. Barrett in reply said he had no doubt *barrettii* was allied to the *Dianthæciæ*, although not absolutely one of them; and that it was known to be an internal feeder; but Mr. Blandford did not remember taking any internal feeding larvæ, although it was certainly among those col-

lected in South Wales. Mr. Carrington was of opinion that the specimen was equal in size to average sized examples from Ireland. Mr. Tutt said he understood that the larvæ in its early stages fed in the upper part of the stem; and Buckler, in his description of the larva, stated it fed in the stem.

Mr. Barrett also exhibited specimens of the original *Catoptria parvulana*, Wilk., taken by Messrs. Bond and McLachlan, with recent specimens reared and taken by Messrs. Fletcher, Bankes, and Vine with intermediate forms, which, in his opinion, proved its identity with *C. Scopliana*, Haw.

Mr. Tutt remarked that collecting at Freshwater, Isle of Wight, he got *C. Scopliana*, every specimen typical; while at some distance from Freshwater he took what he at first always supposed to be small specimens of *C. parvulana*, many of these were drying their wings; he had now come to the conclusion that they were a local form of *Scopliana*.

Mr. E. Joy exhibited a specimen of *Mantis religiosa*, Latr., taken by himself at Ismailia, Lower Egypt.

Mr. A. L. Clarke exhibited the bog-asphodel (*Narthecium ossifragum*, Huds.).

Mr. Tugwell exhibited the tuberous moschatel (*Adoxa moschatellina*, L.), and remarked that this plant occupied a rather difficult position in the classification of plants, there being a difference of opinion as to where it should be placed; some botanists had classed it with the honeysuckle; but from the formation of the flower it seemed more allied to the ivy; and it had now for some time been included in the order *Araliaceæ*.

Mr. E. Step also exhibited fresh plants of wood sorrell (*Oxalis acetosella*, L.), and gave a short description of the plant and of its inflorescence, pointing out that the flowers closed towards evening and also on the approach of threatening weather; he also described the method in which the seed was distributed, and referred to the other two species of *Oxalis*, viz., *corniculata*, L., and *stricta*, L., both of which, he said, were now considered as not truly indigenous. The former species was very rare, and confined to the south of England; the two species were generally found in gardens and shrubberies.

Mr. Perks exhibited *Polyporus squamosus*, Fries., obtained from an elm tree in St. James's Park.

APRIL 10th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Lieut. E. W. Brown and Mr. R. McAllan were elected members.

Mr. Billups exhibited a drawer containing types of nearly all the known British Chrysididæ, many of them being of great rarity; also a fine series of British Ichneumonidæ. Mr. Billups in addition showed the curious galls upon willow, that had been sent by Mr. Cockerell from Colorado, exhibited at a previous meeting, and stated that from the galls he had bred the maker *Cecidomyia salicis-siliqua*, Walsh., a long series of which were also shown.

Mr. C. Fenn exhibited a long series of *Larentia multistri-garia*, Haw., from Dartford Heath, Kent, the whole series showing a tendency to melanism.

Mr. W. H. Tugwell exhibited a series of *Tephrosia crepus-cularia*, Hb., and *T. biundularia*, Bkh., with water-colour drawings of larvæ of both from life, and remarked that after repeatedly breeding both insects he was convinced as to their being distinct species, although evidently closely allied. *T. crepuscularia* appeared in the woods round London from the last week in March to the middle of April, and was invariably a partly double-brooded species, the larva being full fed at the end of May; a portion of this brood appear as imagines early in July. These imagines are smaller than the spring brood, and much less distinctly marked; in fact, have a washed-out look. *Tephrosia biundularia* appears early in May until first week in June, and is only a single-brooded species. In every case the insects remain true to the parent type; and although the markings are somewhat alike in both, yet there were characteristic differences as shown in the series exhibited, and this applied to the larval stage also, and was more easily followed by the drawing than by any verbal description.

Mr. Tutt said he agreed with Mr. Tugwell in considering them distinct, because the two forms occurred at different times, and had, in the imago state, certain broad general characteristics which could be recognised by a trained eye. The fact also that *crepuscularia* in nature was more or less double-brooded, whilst *biundularia* was single-brooded, was also a strong argument for keeping them distinct. In many genera the imagines of other allied species showed superficial resemblance, but were generally considered distinct.

Mr. C. Fenn remarked that he had repeatedly bred both

species, and had always found that the two species bred true: he had also observed differences between the two larvæ.

Mr. C. G. Barrett said that his attention was first drawn to the subject by Professor Zeller, who expressed a decided opinion as to the identity of the two so-called species, and forwarded at the same time German specimens which could not be referred to one more than to the other. Similar forms had been found in the hill districts of the middle and north of England, where neither form was to be obtained at the same dates as in the south. He further said that the markings and shape of the wings in the two forms were absolutely identical, the difference being merely one of colour, and that the distinctions between the larvæ as shown in the drawings appeared to be simply that one form was darker than the other. In his experience he had found the form *biundularia* to produce a second brood as frequently as the other, and taking the numerous variations into consideration he was convinced that the two formed but one species.

Mr. Carrington said it was well known that larvæ varied in certain localities; an almost black form of the imago of *crepuscularia* occurred in the North of England, in which the ordinary markings were entirely obliterated.

Mr. E. Joy exhibited a collection of marine and land shells from Lake Timsah, Lower Egypt, collected by himself in February last.

Mr. Step said that among them were species of the marine genera, *Pinna*, L., *Cyprina*, Lamarck., *Venus*, L., and *Donax*, L.

Mr. Tugwell exhibited some gold carp from Japan, allied to the form generally kept in this country; and he called attention to the terminal fin, which was developed into a curious fanlike shape, closely resembling the form of fan carried by the Japanese and Chinese people: he stated that these fish were bred with a great deal of care, so as to develop this fin; in some of the largest specimens it was quite three inches across. Only six specimens survived the voyage from Japan, out of several hundreds that were shipped for England under the care of Mr. Wymer.

Mr. Carrington said that the price for specimens of this variety of the carp ranged from ten shillings to five pounds in England, but in Paris he had seen them fetch as much as 150 francs. They were very easy to keep if given sufficient space and kept fed; they could stand a good deal of cold, but it did not do to allow the water to chill down too quickly.

Mr. E. Step exhibited an example of the Great Weaver (*Trachinus draco*, L.), from Cornwall, which he remarked was not a common fish on the English coast; it was known to fishermen as the sting-bull and sea-cat, on account of it having the power to inflict a sharp wound which became exceedingly painful. It would be noticed that the eyes were situated very near the top of the head, and in front of them were too little horny points, each very firm and sharp; the real sting was, however, inflicted by a smaller spine just in front of the dorsal fin. If this spine were examined, a little groove would be seen; this groove was stated by some naturalists to be connected with a small gland at the base of the spine, in which the poisonous matter was secreted. Of late years some writers had expressed considerable doubt as to the poisonous character of the wound caused by this fish; although from what he had heard of it in Cornwall, he had little doubt but that it was of a poisonous nature.

Mr. Carrington said he was not prepared to say that the wound was actually poisonous, but it certainly produced a considerable amount of inflammation. The flesh of this fish was used as food, and it was stated, he did not think on any authority, by fishermen, that there was a penal clause in some Act of Parliament prohibiting it being sent to market without having first cut out this spine; as a wound inflicted, even after the death of the fish was attended by grave results. The other species, the Lesser Weaver (*T. vipera*, Cuv. et Valenc.), he had frequently seen alive; it had a habit of burying itself in the sand and mud, only leaving the head exposed.

Mr. W. West (Streatham) expressed an opinion that the larger species was not so rare as was generally supposed, a friend of his at Brighton frequently got it off that coast.

Mr. C. A. Briggs said it was fairly common on the Kentish coast.

APRIL 24th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Mr. F. Warne exhibited a melanic variety of *Hemerophila abruptaria*, Thnb., taken in the London district.

Mr. C. G. Barrett inquired whether this dark variety of *H. abruptaria* was known to occur in any other locality than that of London, either west or north of England.

Mr. South said as far as he knew it was confined to London, a specimen was taken the previous year at Regent's Park, and others had been recorded at various times. Mr.

Carrington remarked it seemed to be generally known that it did not appear outside the metropolitan area. Mr. Briggs added that it was only found in the North and East of London.

Mr. D. J. Rice exhibited on behalf of Mr. H. Syer Cuming, F.S.A., the original rules and constitution of the Aurelian Society, dated June 1st, 1801, and signed by A. H. Haworth, F.L.S., John Burrell, F.L.S., William Skrimshire, Jun., Thos. Skrimshire, LL.B., Robert Scales, Thos. G. Ingall, John Hatchett, Peter M. Watson, John Rippon, William Anderson, William Jackson Hooker, Richard Cuming. The rules and objects of the Entomological Society of London, founded on the Aurelian Society, drawn up on parchment, dated 1st May, 1806, and signed by A. H. Haworth, F.L.S., John Burrell, M.A., F.L.S., T. Skrimshire, R. Scales, T. G. Ingall, J. Hatchett, J. Howard, J. Hooker, Jun., R. Cuming, James Savage, J. S. Neale, William Savage Ibbetson Fenton. Printed book of Bye-laws of the Entomological Society of London, 1807. An autograph letter and circular signed by A. H. Haworth, President, dissolving the Entomological Society, postmark April 10th, 1806. A priced catalogue of Haworth's Collection, which was sold by auction at Stevens' on Monday, 23rd day of June, 1834, and the ten following days (Sunday excepted) at 12 o'clock. A catalogue of Exotic insects belonging to the Entomological Society of London, sold by auction at Stevens', Friday, 16th of April, 1858.

Mr. E. Step exhibited the Wood Spurge (*Euphorbia amygdaloides*, L.), and remarked on the structure of the flower. He said that all the British species of *Euphorbia* differed very little, so far as the flower structure was concerned, and this in connection with the milky juice, noticed on breaking the stems, enabled botanists to always identify the genus.

Mr. Tugwell exhibited flowering spikes of the common Butter-bur (*Petasites vulgaris*, Desf.), and mentioned that it was an interesting plant to Lepidopterists, as being the food-plant of *Hydræcia petasitis*, Dbl.

Mr. Carrington said he understood the northern collectors took the species flying slowly over and crawling about beneath the leaves.

Mr. Tutt remarked that at Sheffield, the species was taken in the factory yards on the plants which grew among the refuse, but it was very rarely taken on the larger plants growing on the river banks.

Mr. Carrington stated he had just returned from the North, and with reference to the variety *radiata*, St., of *Spilosoma lubricipeda*, Esp., remarked that between 1860 and 1870 this particular variety only occurred in a timber-yard close to the railway station at York; he now found that when the station was enlarged the timber-yard was taken by the railway, but the variety still occurred in the neighbourhood, and that from the larvæ now taken in the various gardens throughout the district, a fair proportion of the variety was bred; this was interesting as showing the establishment of certain types of variation.

Mr. R. Adkin read a paper: "The occasional abundance of certain species of Lepidoptera." Some observations were made on the paper printed in full at end of this Abstract. Mr. Tugwell exhibited long series of Continental and British *Deilephila galii*, Schiff., to illustrate the difference in size between the two; he expressed himself as clearly of opinion that the English-fed *galii* were smaller than those from the Continent; this he attributed to the larva not feeding up so well in this country, in addition, none of those he had bred produced ova; and he had no doubt that when it occurred in this country, it was from ova deposited by immigrants, and that the imagines produced were so weakened by our climate, that they could not reproduce their species; he also referred to *Anosia plexippus*, L., and *Colias edusa*, Fb., as other instances of immigration. Mr. South, referring to the remarks on *Plusia gamma*, L., said he should think it was an onward movement; in that case not emigration, but immigration; from the Isle of Wight to the mainland, a continuance of the migration. With regard to the whole question he was inclined to go a very long way; he thought that many generally distributed species really became common in certain years, from the fact that large numbers came over here and helped to produce the abundance occasionally noticed. Referring entirely to common species, he instanced *Agrotis saucia*, Hb., as being in many years quite scarce, and in other years extremely abundant, not only as regards the southern portion of the country, but even far north; another species was *Triphæna pronuba*, L., no doubt favourable years would increase its numbers, but in addition he certainly thought that the species was sometimes so extremely abundant, that it must have received some help from immigration. Mr. C. G. Barrett thought there was a little more direct evidence than mentioned by Mr. Adkin, in particular he remembered that in 1872 the first specimens of *Vanessa antiopa*, L., recorded,

were on the north-east coast, in the neighbourhood of Cromer, in the exact line of migration taken by so many species of birds. As the records came in from various districts, it was found that the insects spread first through Norfolk and adjoining counties, going steadily further west, until in about a week notices came from Herefordshire, Worcestershire, and also from districts northward and southward extending over the whole kingdom. He said that Mr. Adkin had already touched upon the abundance and disappearance of *C. edusa* and *V. cardui*; it had been noticed that the larvæ resulting from an unusual abundance of either of these species, fed exceedingly late in the season, and after the pupal change frequently died in the winter. Probably in warmer countries the species emerged earlier than with us, and after arriving here there was not sufficient time for a second brood to come to maturity. He remembered on one occasion attempting to rear some *Deiopeia pulchella*, L., from the South of France; the larvæ were fed in the sunshine, and were feeding up rapidly, and one had become full-fed and had spun up, when the weather turned wet and dull, and the remainder of the larvæ refused to feed, and died. Mr. Carrington remarked that Mr. Barrett had made a very valuable suggestion, when he stated that the females of an immigrating species had not sufficient time to reproduce their kind in the manner which was usual with individuals of the same species inhabiting this country. That the evidence as to birds invariably following certain lines, was conclusive from the observations made by ornithologists, but with regard to insects he thought it was extremely fragmentary, and a good deal more attention would have to be paid to insects before it could be accepted as finally settled that insects in immigration followed the same lines as birds. Mr. Barrett observed that it would be impossible to get the same evidence with regard to insects as was obtainable in the case of birds. Mr. Adkin, in reply, said that it was quite true as Mr. Barrett stated, that there was good reason for supposing that the migrations of Lepidoptera followed the same tracks as those of birds, and he fully believed that it would ultimately be proved that they did so. Although he was unable at present to produce any conclusive evidence, he thought the general bearing of what he had submitted, taken as a whole, pointed very strongly to such a supposition being correct.

MAY 8th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Messrs. S. G. C. Russell, G. C. Dennis and I. H. Rowntree were elected members.

Mr. C. Fenn exhibited *Hedya pauperana*, Dup., taken by himself, the specimens were beaten from rose.

Mr. Moore exhibited galls from the so-called whistling tree, *Acacia fistula*, from Lower Egypt.

Mr. E. Step exhibited *Arum maculatum*, L., in flower, and remarked that cross fertilization of this species was brought about by small flies, chiefly Diptera, which attracted by the upper part of the spathe worked their way into the lower part, which imprisoned them; the flies were unable to escape, the mouth of their prison being guarded by several rows of hairs, which although permitting the flies to enter, yet prevented their escape; if the flies had come from other flowers they cross-fertilized the stigmas: at a later stage the stigmas wither, the anthers dehisce, the pollen falls on to the lower part of the spathe, and the insects get covered with it; the rows of hairs also wither, the flies escape, and covered with the pollen enter other flowers in their early stages.

Mr. Step referring to the sloughs of Newts shown by Mr. R. Adkin at a previous meeting, exhibited skins of the Warty Newt, Smooth Newt, and of a foreign species, all of which were mounted by Miss C. C. Hopley.

MAY 22nd, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Mr. S. Edwards exhibited a pair of *Sericinus mentela*, from China, *Papilio junaka*, and *P. migarus*, from India, and two Coleoptera belonging to the family Sagra from Africa, and remarked that *Papilio migarus* belonged to the *xenocles* group and mimicked one of the *Danaids*.

Mr. Hawes exhibited leaves of buckthorn with eggs of *Gonopteryx rhamni*, L., *in situ*, and stated he had seen the female deposit the ova on a small plant of buckthorn, growing in a hedge on the outskirts of a wood.

Mr. Frohawk remarked that on the previous Sunday he had seen a number of female *rhamni*, and could have taken twenty or thirty dozen ova if he had liked, the egg was laid on the under side of the leaf close to the mid-rib. Mr. Frohawk exhibited a microscopical drawing of the egg, and a life size coloured drawing of a piece of buckthorn, not three inches in height, upon which he had found seven eggs.

Mr. C. Fenn exhibited a long series of *Saturnia pavonia*, L., reared from eggs which were obtained from a female taken at Bournemouth; he pointed out that the specimens were unusually large, and the males very brilliantly coloured; the larvæ were fed on sallow.

Mr. C. Fenn also exhibited a long series of *Spilosoma mendica*, Clerck., and stated they were reared from the egg. The parent ♀ was taken at Eltham, and the larvæ were fed on the common broad-leaved plantain; forty-two imagines were bred, twenty-one ♂ and twenty-two ♀. The females varied little from the ordinary type with one exception, which was curiously blotched with dark grey on the left side of the superior wing. The males varied from the usual English type up to a dull pale yellowish grey, and quite 50 per cent. diverged more or less from the usual blackish grey form. The pupæ were exposed to the weather in a very cold and damp spot, which in Mr. Fenn's opinion rather bore out Mr. Tutt's theory that moisture is the cause of melanism or colour variation. three ?

Mr. R. Adkin remarked that these specimens showed more variation than one expected to find in the neighbourhood of London, and inquired whether anything was known of the male parent, and whether there was any tendency to variation in the female parent. It was noticeable that there was a decided tendency in the males Mr. Fenn had bred to run grey on the head, and in some examples this colour extended slightly to the wings.

Mr. Tutt pointed out that the variation in the male was somewhat similar to the Irish form known as var. *rustica*.

Mr. Rice exhibited two nests of the Great Tit (*Parus major*, L.), which were built in the bottom of a large flower-pot used for forcing rhubarb. Mr. Rice said it was very curious that there should be two nests instead of one in the pot; he was inclined to think that the nest on the left hand side was the one originally built, but the flower-pot resting slightly on the left side the nest became damp, the parent birds after two eggs were laid built a fresh nest on the right side, in which twelve eggs were laid.

Mr. Step exhibited and remarked on some plants collected by Mr. Carrington at Box Hill, Surrey. Among them were examples of the Wood Sanicle (*Sanicula europæa*, L.), which Mr. Step said was very plentiful on the North Downs, and occurred on the chalk up to a considerable height; the plant was frequently passed over, and was certainly a plant that was not well known except to Botanists; at one time it was

believed to have great virtues in the way of healing. It belonged to the order Umbelliferae, although at first sight one would not think so. The next species was *Asplenium ruta-muraria*, L., which Mr. Step said occurred very abundantly on the walls in Headley Lane, Box Hill; there were also specimens of the Bird's-nest Orchid (*Neottia nidus-avis*, Rich.), which he stated was parasitic upon roots, chiefly on those of beech trees; but there was some doubt as to whether it was entirely parasitic or only so at certain stages; it got its name from the peculiar condition of its roots, which very closely resembled the nests of certain birds whose nests were composed of a collection of twigs. Mr. Step then gave an interesting account of the fertilization of orchids by means of insects.

Mr. Carrington remarked that the pollen masses on the proboscis of certain bees were at one time supposed to be of a fungoid growth, but upon their being examined under a microscope they were found to be masses of pollen from an orchis.

Mr. West (Streatham), remarked that the *Asplenium* was easily grown in a flower-pot with some old bricks pressed into the soil; he had the species growing for the last four years.

JUNE 12th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Messrs. B. G. Rye, H. McArthur and A. Ward were elected members.

Mr. R. Adkin exhibited nests of a species of *Vespa* attached to heather, from Bournemouth, together with the imago which had just emerged.

Mr. Billups said the species was *Eumenes coarctata*, L., a solitary Wasp, and the only representative of the genus we had in Britain; he then described the habits of the insects, and exhibited various parasites belonging to the families Ichneumonidae, Chrysididae, Syrphidae, and Staphylinidae, and added that the Vespidae were particularly subject to the attacks of parasites.

Mr. Billups exhibited nests of solitary wasps from Borneo, with their maker; also a very fine nest of a social wasp, *Pelopæus architectus*, St. Farg., with the imagos from Kentucky.

Mr. Billups also exhibited on behalf of Mr. Henderson, some abnormally large specimens of *Paniscus cephalotes*, Holmgr., bred from the larvæ of *Dicranura vinula*, L.

Mr. J. R. Wellman exhibited a bred series of *Acronycta*

strigosa, Fb., from Cambridge, and *Eupithecia venosata*, Fb., which had been two years in pupa.

Mr. Nussey exhibited a specimen of *Smerinthus tiliæ*, L., the central band on the superior wings being represented by a small spot.

Mr. West (Streatham) exhibited a similar variety of *S. tiliæ*.

Mr. H. Robson exhibited a specimen of *Zonosoma punctaria*, L., having a broad dark band across both the superior and inferior wings.

Mr. W. H. Tugwell exhibited a very strongly marked male of *Biston hirtaria*, Clerck., of a yellow fawn ground colour. Mr. Carrington remarked that it closely resembled the Rannoch form of the species.

Mr. R. Adkin exhibited living larvæ of *Larentia cæsiata*, Lang., from the Grampian hills, and which were found feeding on heather.

Mr. R. Adkin also exhibited on behalf of Mrs. Hutchinson of Leominster, small and brightly-marked specimens of *Herbula cespitalis*, Schiff., taken at the Land's End, Cornwall, by Miss Hutchinson; it was remarked that the colour of the specimens was unusually yellow.

Mr. Winkworth exhibited three clutches of eggs of the common thrush *Turdus musicus*, L., showing variation. He said that the least strongly marked specimens had been laid first, and those with markings better developed afterwards. Mr. Rice remarked that it was usual that the eggs which were first laid were the most strongly marked, and the markings became fainter as more eggs were deposited.

Mr. Tugwell exhibited a bunch of butterfly orchis (*Habenaria bifolia*, Br.), received from Mr. L. Gibb, and remarked on its delightful fragrance at night; there were generally supposed to be two species of this orchis growing in this country, the small one found on boggy heaths, here exhibited, and another variety growing from 18 in. to 2 ft. in height, in shady places in woods on chalk, etc., the principal difference being in the position of the anther cells. In *H. bifolia* they were parallel, and in *H. chlorantha* these organs diverged widely at the base.

Mr. Mansbridge stated that he had seen *Orchis mascula*, L., in Mr. Bull's nursery at Chelsea with the spike 8 in. long; this was remarkably large, and was the result of cultivation. Mr. Step said that fertilization of *H. bifolia* was effected by certain moths, and Mr. Tugwell said he had moths in his collection with pollen masses adhering to their tongues, notably some

species of the *Zygænæ*. Mr. Carrington remarked that it was generally supposed that to transplant orchids successfully was a difficult matter. He had this year transplanted some numbers of six different species, and all flowered and showed every sign of doing well.

JUNE 26th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Mr. R. South exhibited Micro-lepidoptera collected by Mr. Leech, Mr. McArthur, and himself, during ten days spent at Tancarville, Normandy. He remarked that among the Lepidoptera taken, there were only two species which did not occur in this country.

Mr. C. Fenn exhibited Tortrices taken and bred this year from the South London district. Among them were specimens of *Tortrix branderiana*, St., *Phoxopteryx upupana*, Tr., and *Penthina variegana*, Hb., var. *nubiferana*, Haw.

Mr. A. Robinson exhibited a long series of *Sesia sphegiformis*, Fb., from Sussex, and stated that half of them were bred, and the others were taken by "assembling."

Mr. R. Adkin exhibited three specimens of *Biston hirtaria*, Clerck., from Lewisham, and pointed out that one was very similar to, although not quite so strongly marked, as the one shown by Mr. Tugwell at the previous meeting. Mr. Adkin expressed an opinion that the majority of the specimens observed this year were brighter in coloration than was usual with the species. Mr. Tugwell said that in the Greenwich and Lewisham districts it was commoner than usual.

Mr. Cockerell remarked that with the exception of *Bombyx mori*, L., there were no records of lepidoptera feeding on the mulberry tree; he, however, wished to exhibit a larva which had been found feeding on this tree. Mr. C. Fenn said that the larva was that of *Tæniocampa stabilis*, View., a species which would feed on all garden trees and shrubs.

Mr. Mansbridge exhibited *Cænonympha pamphilus*, L., var. *lyllus*, Esp.

Mr. F. W. Hawes exhibited living larvæ of *Thecla rubi*, L., and remarked that recently in Essex he noticed that the species was nearly over; in the hopes of obtaining ova he watched, and found that the females laid the eggs on broom (*Sarothamnus scoparius*, Koch.); they were laid between the leaflets. The ova hatched very quickly; and although the larvæ fed on broom, they took very freely to the bramble blossom.

Mr. Billups exhibited, on behalf of Mr. South, types of

forty species of Coleoptera, one of Ichneumonidæ, one of Diptera, and one of Homoptera, collected by that gentleman on his recent trip to Tancarville, Normandy, France. Mr. Billups also called attention to two very curious pupa cases, attached to leaves of poplar, also presented to him by Mr. South from the same locality. Mr. Billups said the insects which had just emerged were a species of *Cassinaria*, but he had not had opportunity to closely examine as to species. Mr. South said he could give no idea as to the host.

Mr. Billups also exhibited a fine series of the pretty little Longicorn *Leptida brevipennis*, Muls., on behalf of Mr. Mansbridge, who captured them in his laboratory, where for some few days they had been in large numbers. Mr. Billups said he understood from Mr. Mansbridge that there were some wicker baskets which came from abroad, stored where the specimens were captured, and there was very little doubt that they had been brought to this country in these baskets. Some five years ago, a number of Dutch baskets were stored in the Borough market, and from these large numbers of this species emerged, and were flying all over the market.

Mr. Billups exhibited types of insects taken at Mickleham by himself on the occasion of the Society's excursion, June 21st, 1890. They included the following orders: Diptera, 29 species; Hymenoptera, 23 species, consisting of the following sub-families—Hymenoptera aculeata, 2 species; Ichneumonidæ, 11 species; Chalcididæ, 2 species; Tenthredinidæ, 2 species; Gall makers, 2 species; and Oxyuridæ, 4 species; Coleoptera, 5 species; Hemiptera, 2 species; Homoptera, 1 species; and Neuroptera, 1 species; in all 104 insects, representing 10 families. The species were as follows: *Scatopse notata*, L., *Dilophus febrilis*, L., *Bibio marci*, L., and *johannis*, L., *Simulium reptans*, L., one specimen of *Chironomus*, not determined; *Pachyrrhina crocata*, L., *Tipula oleracea*, L., *Pachygaster leachii*, Curt., *Nemotelus nigrinus*, Fln., *Beris clavipes*, L., and *chalybeata*, Först., *Hæmatopota pluvialis*, L., *Chrysops cæcutiens*, L., *Leptis scolopacea*, L., *Leptogaster cylindricus*, Deg., *Dioctria rufipes*, Deg., and *Baumhaueri*, Mg., *Dysmachius trigonus*, Mg., *Rhamphomyia sulcata*, Fln., *Empis tessellata*, F., and *livida*, L., *Dolichopus æneus*, Deg., *Leucozna lucorum*, L., *Conops vitellinus*, Lw., *Tetanocera punctulata*, Scop., *Platystoma seminationis*, F., *Acidia heraclei*, L., and *Spilographa zœe*, Mg. Amongst the Hymenoptera were the following: *Odynerus parietum*, L., *Prosopis communis*, Nyl., *Nomada alternata*, Kirby., *Chasmodon notatorius*, Fab., *Ichneumon vaginatorius*,

L., *S. luctatorius*, L., and *latrator*, Fab., *Colpognathus celerator*, Gr., *Dicælotus pumilius*, Gr., *Phæogenes planifrons*, Gr., and *P. fulvitaris*, Gr., *Hemiteles bicolorinus*, Gr., and *Pezomachus distinctus*, Först. The only representatives of the Oxyuridæ being *Proctotrypes ater*, Hal., *Codrus apterogynus*, Hal., *Lagnodes pallidus*, Först., and *Chelogynus lapponicus*, Hal. *Callimome regius*, Ns., and *Syntonaspis caudata*, Ns., served as types of the Chalcididæ. The Cynipidæ also had only two representatives in *Rhodites rosæ*, L., and *R. eglanteriæ*, Hartig. The only species representing the saw-flies were *Lophorus pini*, L., and *Hylotoma cyanea-crocea*, Cam. The only species of Coleoptera taken were *Scaphisoma agaricinum*, Ol., *Cistela murina*, L., *Ædemera lurida*, Marsh., *Magdalinus aterrima*, L., and *Clytus arietis*, L. The types of Hemiptera were *Pantilus tunicatus*, Fab., *Stiphrosoma leucocephalum*, L.; the only species of Homoptera being *Philænus exclamationis*, Thunb., Neuroptera being badly represented in a solitary specimen of *Stenopsocus cruciatus*, L. To the above might be added three species of Arachnida—*Marpera nervosa*, Clerck., *Dysdera cambridgii*, Thor., and *Nemastoma bimaculata*, Meig.

On behalf of Mr. Cooper, Mr. Billups read a note and exhibited a large number of the Scarabideous coleopteron, *Trox scaber*, L., which had been swarming in thousands over the leaves in a large vinery in Kent.

Mr. Tugwell exhibited the common butterwort (*Pinguicula vulgaris*, L.), a plant which he said occurred on northern bogs and mosses in profuse abundance. It was an interesting plant, as the Laplanders and Norwegians used the leaves for preparing milk for food; the action was somewhat similar to that of rennet. He also exhibited the broad-leaved cotton grass (*Eriophorum latifolium*, Hoppe) and the great English sun-dew (*Drosera anglica*, Huds.), which latter he stated was not so common as the other two species of *Drosera*. Mr. Adkin said that *D. intermedia*, L., occurred throughout the district around Woking; and Mr. West (Streatham) said he had met with it in the New Forest.

Mr. Carrington stated he had been staying in the neighbourhood of Abbot's Wood, Sussex, and he wished to put it on record that he had never found lepidoptera so scarce; sugaring was an entire failure, and one looked with pleasure at the odd specimens of *Melanippe montanata*, Bork., that were occasionally seen; he had found *Melitea athalia*, Rott., occurred very freely at its headquarters in the wood, although throughout the other parts of the same wood it only occurred

singly, and he had taken it twice in the White Field. *Ennychia octomaculata*, Fb., and *Eupithecia plumbeolata*, Haw., were perhaps the only two other species of any importance. The Rev. E. C. Dobree Fox and the Rev. C. F. Thornehill were also collecting in the neighbourhood at the time with similar experiences to his own; he, in company with these two gentlemen, twice visited Beachy Head, and they took between them on the first occasion twenty-five, and on the second occasion, twelve specimens only.

Mr. Carrington stated further that on Beachy Head he noticed the bee orchis (*Ophrys apifera*, Huds.) in greater profusion than he had ever seen it before; on getting back to Box Hill on the 10th instant he found the species just beginning to come into flower; it would therefore seem that at Beachy Head it flowered a week earlier than at Box Hill.

Mr. Billups asked with reference to the habits of the heron whether they flew in flocks or in pairs; as on the 22nd instant, he saw seven fly over the Borough in the direction of Battersea.

Mr. C. Fenn said on the Devonshire Moors they could be seen in flocks of twenty or thirty, but about the London district they were generally seen either singly or in pairs.

Mr. Carrington remarked that in the south of England they generally flew singly; he had frequently seen single examples cross over Box Hill and Dorking in February and March, and in the marshes below Southend, Essex, they occurred singly. Mr. T. D. A. Cockerell added that in the west of London they passed over singly or in pairs.

JULY 10th, 1890.

W. H. TUGWELL, Esq., *Vice-President*, in the Chair.

The Revs. C. F. Thornehill, E. C. Dobree-Fox and Mr. B. A. Bristowe were elected members.

Adverting to Colonel Blathwayt's communication to the *Entomologist's Monthly Magazine* for the month of April last, p. 109, Mr. Jenner Weir exhibited specimens of the two forms of the Dipteron *Volucella bombylans*, L., which mimicked the Hymenopterous *Bombus lapidarius*, L., and *Bombus terrestris*, Kirby, respectively; stating that he fully concurred with the Colonel in considering that this remarkable dimorphic condition of the *Volucella* assisted it to become parasitic upon two species of *Bombus* differing both in colour and markings, and stated that it was interesting to observe that, notwithstanding the two static conditions of the insect

differed profoundly in the colour of the thorax and abdomen, yet the wings both in colour and markings were identical.

He also exhibited a specimen of the *Volucella*, which he had recently taken at Bournemouth, in which the mimicry was imperfect, inasmuch as the arrangement of the colour resembled that of *Bombus lapidarius*; but instead of the hairs at the end of the abdomen being red, they were of a yellowish colour, as in the mimic of *Bombus terrestris*.

He showed also a specimen of the large worker of *Formica rufa*, L., to the antenna of which was attached, by the closed jaws, the head and part of the thorax of another ant with which no doubt it had fought, and destroyed the abdomen and most of the thorax of its adversary, but could not detach the head, which in death had firmly gripped its conqueror.

Mr. E. Joy exhibited *Nascia ciliialis*, Hb., and *Zeuzera arundinis*, Fb., from Wicken Fen.

Mr. Jäger exhibited *Dianthæcia carpophaga*, Bork., and *D. capsophila*, Dup., bred from larvæ collected in the Isle of Man and in South Wales; he also exhibited a dark specimen of *D. cæsia*, Bork., and remarked that although he had collected the seed heads, he had only bred this one specimen; he understood, however, from Mr. Gregson that the larvæ fed on the flowers, and not in the seed head.

Mr. Wellman exhibited examples of the genus *Dianthæcia*, from Liverpool, Isle of Man, Surrey, Ireland, and South of Scotland; also a series of one hundred specimens of *Eupithecia rectangulata*, L., var. *nigrosericeata*, Haw; he stated that the whole of them were taken at Streatham, from six apple trees.

Mr. V. Gerrard exhibited a series of *Emydia cribrum*, L., taken near Ringwood, Hants, where he said it had occurred very freely.

Mr. A. W. Dennis exhibited a very pale variety of *Argynnis euphrosyne*, L., taken at Dorking, Surrey.

Mr. R. Adkin exhibited *Eupithecia nanata*, Hb., from Hants and Surrey, and called attention to the extreme variability of the species. The five Surrey specimens, being about half of a series taken haphazard one afternoon in the beginning of May last, and showed the following comparative distinction.

1. Central band ill-defined, submarginal band distinct and complete.
2. Central band sharply defined, submarginal band broad, distinct, and intersected by white apical splash.
3. Submarginal band narrow, intersected.
4. " " " complete.
5. " " broad, not sharply defined.

Mr. Howard Vaughan exhibited, among other species, *Cænonympha typhon* Rott., which he remarked differed from the ordinary Perthshire specimens, many of them having ocellated spots; *Scoparia ambigualis*, Tr., and var. *atomalis* from North Knapdale and Kilmartin, Argyllshire, and from Edlean Righ, Sound of Jura, a dark form of *Larentia viridaria*, Fb., and two female *Procris*, which differed considerably from *P. statices*, and upon the identity of which the members did not hazard an opinion. Mr. Vaughan remarked that they appeared to him to be intermediate between *statices* and *globulariæ*.

Mr. C. A. Briggs exhibited the three British species of the genus *Procris*, for comparison.

Mr. J. Jenner Weir remarked that the goldfinch (*Carduelis elegans*, Stephens), had been successfully introduced into New Zealand, and he had received from that country a nest of the bird (which he exhibited), and it was worthy of notice that although the materials of which it was made were necessarily different from those obtainable in England, yet the nest had an extraordinary resemblance to those built in this country.

Mr. T. D. A. Cockerell exhibited specimens of *Hyalina draparnaldi*, Beck, from Clifton, Bristol; *Clausilia rolphii*, Gray, from Crabbe Wood, near Winchester; and *C. biplicata*, Mont., from near Putney. He remarked that these were some of the rarest shells found near London. *H. draparnaldi* occurred at Isleworth, *C. biplicata* was locally abundant at Putney, and *C. rolphii* was found in Surrey, Sussex, etc.

Mr. Farrant exhibited fresh plants of the Starry-headed Trefoil (*Trifolium stellatum*, L.), from the sea-shore at Shoreham, Sussex, and remarked that it was not so plentiful as it used to be.

JULY 24th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Messrs. G. Bryant, A. Hewk and R. A. Clark, M.A., were elected members.

Mr. Wellman exhibited living larvæ of *Dianthæcia nana*, Rott., *D. cucubali*, Fues., and *D. carpophaga*, Bork.

Mr. West exhibited *Apamea ophiogramma*, Esp., taken hovering over flowers in his garden at Streatham; he mentioned that he still continued to find the larvæ feeding on ribbon grass *Phalaris arundinacea*, L.

Mr. Carrington stated that Mr. Briggs when living at St. John's Wood had two or three large plants of ribbon grass,

and obtained *A. ophiogramma*. He changed his residence on several occasions, taking with him these plants, and by so doing he had been able to capture a specimen or two of this species every year: Mr. Hickling, on taking a house at Sidcup, Kent, found the garden very much overgrown, and in putting it in order he found a number of larvæ among the roots of riband-grass. Thinking it nothing but a common species, he only kept about twenty of these, but they turned out to be *A. ophiogramma*. Mr. Hickling had told him that he must have destroyed a great number in digging over the ground, and he had not been able to obtain the species since.

Mr. Turner exhibited a variety of the larva of *Biston hirtaria*, Clerck., the usual brown pigment not having developed.

Mr. Moore exhibited a variety of *Arctia caia*, L., bred from a larva taken in his garden at Rotherhithe; the superior wings were suffused with brown, the usual cream markings only being represented by a faint line on the inner margin, the spots on the inferior wings coalesced, the red only appearing at the base, along the inner, and a portion of the hind, margin.

Mr. C. S. Bouttell exhibited three specimens of *Melanippe fluctuata*, L., taken in his garden at Catford, Kent; one was completely banded, the second an extremely pale form with hardly any markings except a small spot on each of the superior wings, and the third a very dark form, closely approaching the variety *neapolisata*, Mill.; also varieties of *Hypsipetes sordidata*, Fb., bred from larvæ obtained from Sallow at Hastings, Sussex.

Mr. Carrington exhibited specimens of the Sea-holly (*Eryngium maritimum*, L.), and remarked that the larva of one of the rarer Tortrices *Argyrolepis maritima*, Gn., fed in the roots, and was taken in good numbers along the coast, where the plant occurred, up to the Norfolk coast; the flowers were particularly attractive to the genus *Vanessa*, and to other butterflies which were out when the plant was in bloom. On one occasion he saw some hundreds of specimens of *V. cardui*, L., and other species attracted by some fifty or a hundred flowers. He also exhibited the Seaside Bindweed (*Convolvulus soldanella*, L.), which he stated occurred on sand close to the sea.

Mr. C. G. Barrett mentioned that *Depressaria cnicella*, Tr., fed in the shoots of *Eryngium maritimum*.

Mr. Step exhibited and remarked on the Nettle-leaved Bell-flower (*Campanula trachelium*, L.), describing in detail

the structure of the flower, and the method by which cross fertilization was ensured; also the Greater Knapweed (*Centaurea scabiosa*, L.), both species from Surrey.

Mr. Carrington said that he thought the colour of the Campanula flowers was much lighter than was usual with the species, he had noticed that at Dorking, in Essex and Kent, the flowers were much lighter; in one locality near Gravesend they were almost white. *Eupithecia campanulata*, H.-S., could be obtained by gathering the bells, and placing them in a band-box. It was almost hopeless to find the larvæ in the daytime, but at night they were very easily seen. On the Knapweed, *C. scabiosa*, as also on *Scabiosa arvensis*, L., imagines of *Eremobia ochroleuca*, Esp., could be taken sitting on and just under the flower head. At Southend, Essex, he found that in the gardens a dark form of knapweed was cultivated; he could not say whether it was a distinct species or only a variety of *C. scabiosa*.

Mr. J. Jenner Weir agreed that the specimens of Campanula were much paler in colour than was usual.

Mr. Carrington mentioned that some time ago there was considerable discussion relative to the non-appearance of a second brood of *Lycena argiolus*, L., in the New Forest, and it was suggested that this was attributable to the absence of ivy; having this in his mind, he had paid special attention to the point during a recent stay in the Forest, and he found there was a considerable quantity of ivy, on the road from Brockenhurst to Lyndhurst, and on the road from Lyndhurst to Lyndhurst Road Station. On the road from Lyndhurst to Stony Cross there was an enormous quantity of both ivy and holly. Mr. Charles Gulliver had also told him that he took the second brood of *L. argiolus*.

Mr. Hawes added that in 1885 during the month of August, while walking towards Beaulieu, he, in twenty minutes, saw twenty-four species of butterflies, and he also took six fresh specimens of *L. argiolus*.

Mr. Jenner Weir said these statements were quite different from what the Gullivers had told him, Charles, George and Thomas Gulliver had always told him that they never met with a single specimen of the species in the autumn, and he came to the conclusion that the species might in the Forest be single-brooded. In addition he had been to the Forest during the autumn for many years, and had never met with a single example of a second brood; and although he had offered to pay the Gullivers for examples of an autumnal brood, they had never been able to obtain specimens for him.

AUGUST 14th, 1890.

W. H. TUGWELL, Esq., Ph.C., *Vice-President*, in the Chair.

Mr. W. H. Street was elected a member.

Mr. T. R. Billups exhibited *Glypta rubicunda*, Bridg., a species of *Ichneumonidæ*, new to science, bred by Mr. Elisha from a larva of *Argyrolophia maritimana*, Gn., and described by Mr. Bridgman in the *Entomologist's Monthly Magazine* for August. Mr. Billups also exhibited a spider's nest, of the family *Epeiridæ*, from which he had bred *Hemiteles fulvipes*, Gr.; the nest was taken by Mr. R. Adkin, at Leigh, Essex. A cluster of cocoons, formed by *Apanteles spurius*, Wsm., attached to a sprig of heather, and from which the living insects were emerging in some numbers; Mr. Adkin had found these cocoons at Oxshott, Surrey. Also a specimen of the wild rose *Bedeguar* gall, and its maker, *Rhodites rosæ*, L., with one of its parasites, *Callimome bedeguaris*, L.

Mr. Cockerell exhibited larva of *Eriocampa cerasi*, Pack., feeding on leaves of pear, received from Banstead, where they were doing considerable damage. Mr. Cockerell said the species was common in America, as well as in this country. Hellebore was recommended as a remedy.

Mr. B. W. Adkin exhibited a spray of oak leaves, almost entirely covered with the galls of *Neuroterus fumipennis*, Hartg.

Mr. R. South said that he had been taking *Argynnis aglaia*, L., rather commonly at Durham, and had noticed a female of the species depositing ova, and, after a close and careful search, he found three eggs, each of them on a decayed or dead leaf of grass. They were perfectly white when found, but within twelve hours of finding they had turned to the colour of the dead grass leaf. Of course it was well known that the larvæ fed on the different species of *Viola*, upon which he expected to find the ova. Mr. Weir mentioned that he had once seen a female of *Argynnis paphia*, L., deposit her egg on the trunk of a tree. Mr. Tugwell said no doubt there were *Violas* in the neighbourhood; and Mr. South, in reply, said that the eggs were laid among the foodplant, but not attached to it, and were affixed to the decayed grass stems, which a few hours afterwards the eggs resembled in colour.

Mr. Wellman exhibited *Emmelesia unifasciata*, Haw., bred from larvæ obtained at West Norwood in 1888, the species having been two years in pupa.

Mr. South showed specimens of *Hypsipetes sordidata*, Fb., one being strongly banded with red, and having a reddish

spot at the base of the primaries, bred from a larva found in Buckinghamshire; in another the same markings were reproduced in a colour almost white; the larva from which this was bred was found in Devon, and both larvæ were fed on willow. With reference to the first example, Mr. South stated that he had had some hundreds of this species through his hands, but had never met with this particular form before. Mr. South also showed an unusually dark form of *Larentia didymata*, L., from Durham, where the species had been exceedingly common.

Mr. Bouttell exhibited a pale form of *Zygæna filipendulæ*, L., from Leigh, Essex, and *Hesperia lineola*, Ochs., taken at Southend in 1882, which he discovered in his series of *H. thaumas*.

Mr. Turner showed *H. lineola*, taken on the Society's excursion to Leigh. Mr. Nussey exhibited the same species, including a very pale example from Shoeburyness. Mr. Tugwell expressed an opinion that the species occurred on the salt marshes, and those taken on the hills were specimens that had been blown from the salt marshes. Mr. South said the species was plentiful at Tancarville, some 200 or 300 yards from the river Seine, in a limestone quarry, and there was no character of salt marshes whatever. Mr. Barker said he had this year taken a specimen in Sussex, on the chalk.

Mr. H. Moore exhibited varieties of *Abraxas grossulariata*, L., having the spots coalescing in the costa, and also forming bands. One of these was reared upon the Japanese spindle.

Mr. Jenner Weir exhibited living larvæ of *Psyche villosella*, Och., and drew attention to the different kinds of material from which the cases had been constructed; one singular case was formed entirely from pieces of rush, each about one quarter of an inch in length; and although he had had this specimen about two months, it appeared not to have added to its case. Most of the cases had been commenced with the fragments of grass, and afterwards of heath.

He also exhibited one larva from which he had removed the entire case, and had supplied it with strips of coloured paper, from which in a few days it had formed a new habitation. The coloured paper had also been used by another specimen which had not been deprived of its case. During the last two months most of the specimens had doubled the length of their cases. The case was always made from the feeding or proximal end, and never from the distal end, from which latter the imago appears. In one instance where he had made the experiment of cutting off the distal end, the

larva, being unable to repair the breach, forsook the case, and made another habitation.

Mr. W. H. Tugwell exhibited on behalf of Mr. G. T. Porritt, living larvæ of *Eupithecia extensaria*, Fr., feeding on substituted food, namely, *Artemisia abrotanum*, commonly known as "old man," or "southernwood."

Mr. Hawes exhibited living larvæ of *Argynnis selene*, Schiff., and *A. euphrosyne*, L., which were about to hibernate.

Mr. T. R. Billups exhibited 5 species of Coleoptera not in the British list, taken by Messrs. Leech and South in July last at Tancarville, Normandy, namely, *Rhagium mordax*, Fab., *Crioceris brunnea*, Fab., *Chrysomela varians*, Fab., *C. tristis*, Fab., and *C. speciosa*, L. Also a specimen of *Chrysomela rutilans*, Wollaston, taken alive in the Borough market, 8th of October, 1889. Mr. Billups stated that this insect was a native of the Canary Islands, and was most probably imported among the potatoes from those islands.

Mr. Billups also exhibited *Helix incarnata*, Miller, and a white variety; also *Succinea putris*, L., and the variety *limnoidea*, Bandon.

Mr. Cockerell read a list of animals and plants observed in the Leigh (Essex) district between Southend Pier and Hadleigh Castle, July 25, 26, and 27, 1890, showing a total of 229 species and 27 varieties. The list is printed in full in another part of the Proceedings.

AUGUST 28th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Mr. C. Fenn exhibited an abnormal specimen of *Polyommatus phlæas*, L., the left inferior wing being small and pale. *Epinephele ianira*, L., with the right superior wing pallid. Also a number of Tortrices, etc., taken this season, viz., *Pædisca solandriana*, L., from Bexley, bred from birch; *Crambus contaminellus*, Hb., from Deal; *Carpocapsa grossana*, Haw., from Mickleham; *C. pomonella*, L., from Lee; *Grapholitha cæcana*, Schl., from Deal; *Sphaleroptera ictericana*, Haw., from Deal; *Tortrix transitana*, Gn., ♂ and ♀, from among birch, near Sidcup; *Sciaphila conspersana*, Dougl., from Deal; *Odontia dentalis*, Schiff., from amongst *Echium vulgare*, at Deal; and also a series of *Cidaria truncata*, Hufn., bred from ova obtained from a ♀ also exhibited. Mr. South remarked concerning the *C. truncata*, that the female was a variety, and it was noticeable that quite half the brood also varied in the same direction.

Mr. R. Adkin exhibited *Zygæna meliloti*, Esp., from the

New Forest, and remarked upon its disappearance from the particular locality where it was originally taken, and its re-discovery in another part of the Forest.

Mr. Hawes exhibited *Tapinostola extrema*, Hb., from Huntingdonshire, taken in July; also young larvæ of *Apatura iris*, L., and remarked that it had no horn before the third month.

Mr. Frohawk exhibited a variety of *Epinephela hyperanthæ*, L., with lanceolate spots, from the New Forest. Mr. Jenner Weir stated that he had two of this variety from the same locality. Mr. Carrington remarked that he had seen hundreds of this species in the New Forest, but the only variety he met with was the one known as *arete*, Müll.

Mr. Joy exhibited *Plusia festuæ*, L., larva and pupæ, and remarked on the apparent double-broodedness of this species; he understood that at Manchester it occurred in June, but he had taken it in the latter part of August.

Mr. J. Jenner Weir exhibited a variety of the Devil's-bit Scabious (*Scabiosa succisa*, L.), with the flowers of a dirty lavender colour. Mr. Carrington said he had seen this variety in the North of England, and especially in the Shropshire district.

Mr. Step exhibited the Common Ceterach, or Scale-fern (*Ceterach officinarum*, Willd.), from Somersetshire, and remarked that it was formerly recorded as found on a tombstone in Fulham Churchyard and at Highgate; but he knew no locality for the species near London at the present time. Mr. Turner said that fifteen or eighteen years ago it used to occur in Headley Lane. Mr. Jenner Weir mentioned that he found but one plant at Lewes, and that was fifteen or sixteen years ago. Mr. Carrington said he had found it behind the house of Sir Thomas Moncrieff, at Perth.

Mr. T. D. A. Cockerell read a note on the nomenclature of some British slugs. The species commonly called *Amalia marginata*, found commonly near London, was not the true *A. marginata*, Draparnaud (which did not appear to be found in England), but was the *Amalia carinata* (Leach, 1820). The South European sub-species, known as *carinata*, Risso., was antedated by Leach's name, and must now be called *A. fulva* (Paulucci). There was a paper by Dr. J. Kaleniczenko, published in 1851, which antedated some of Moquin-Tandon's varieties of *Arion ater* and *Limax maximus*. Thus we must now write *Limax maximus* var. *krynickyi*, Kal., instead of *johnstoni*, Moq.

Mr. Carrington made some remarks on his experiences in Belgium this year. He had found *Arion ater* var. *rubra*, Moq., near Brussels; and in the market-place he had noticed

five species of edible fungi for sale. Round Ostend he had worked the sandhills for butterflies; he found *Viola tricolor*, L., but could not find the larva of *Argynnis latona*, L., which fed upon it; the sea holly, *Eryngium maritimum*, L., was abundant, but he did not see any of the Vanessidæ flying about it. In the course of a fortnight he took the following species: *Pieris brassicæ*, L. (two specimens), *P. rapæ*, L., *P. napi*, L., *Vanessa cardui*, L., *Satyrus semele*, L., *Cænonympha pamphilus*, L., *Polyommatus phlæas*, L., *Lycæna astrarche*, Bgstr., *L. icarus*, Rott., and *Hesperia lineola*, Ochs. (one specimen). He did not see *Pieris daphidice*, L., nor any species of *Colias*.

A discussion then arose as to the abundance or scarcity of lepidoptera during the season. Mr. Tutt said butterflies had been excessively rare at Deal. *Lycænæ* were practically absent from Cuxton, Kent, but many *Agrotis simulans*, Hufn., had appeared at flowers on the south coast. Mr. C. Fenn mentioned that last year he had seen enormous numbers of *Zygæna filipendulæ*, L., sitting on *Centaurea scabiosa*; and *Lycæna corydon*, Fb., in thousands at St. Margaret's; but this year there were very few of either species. Mr. Carrington remarked that *Hesperia comma*, L., had been common at Box Hill, Surrey. Mr. Turner stated he had found *Lycæna corydon* extremely rare both at Reigate and Purley. Mr. Adkin expressed an opinion that the scarcity of *L. corydon* seemed general; he had been unable to find it in the Kemping district, on the Wrotham range of hills. Mr. Croker added that he had failed to meet with it at Eastbourne. Messrs. Carrington and Jenner Weir remarked on the fondness of *L. corydon* for alighting on sheep droppings.

SEPTEMBER 11th, 1890.

J. JENNER WEIR, F.L.S., etc., *Vice-President*, in the Chair.

Mr. C. Oldham exhibited a specimen of *Sirex gigas*, Fab., taken on the High Road, Woodford, Essex.

Mr. T. D. A. Cockerell exhibited *Vanessa antiopa*, L., from the Wet Mountain Valley, Colorado, and called attention to the irroration of the borders with black, a feature especially noticeable in American specimens.

Mr. Robertson exhibited a living larvæ of *Acherontia atropos*, L., taken near Bognor, Sussex.

Mr. R. Adkin exhibited bred specimens of *Emmelesia decolorata*, Hb., from Ireland, bred from *Silene inflata*, Sm., and pointed out that the specimens were larger than usual.

Mr. Jenner Weir expressed an opinion that the specimens were more defined in colour than English specimens.

Mr. J. A. Cooper exhibited very dark specimens of *Bryophila perla*, Fb., from Folkestone, taken by Mr. Austin ; it was pointed out that these suffused specimens varied much in size.

Mr. J. H. Carpenter exhibited a specimen of *Argynnis paphia*, L., the right inferior wing being almost colourless ; a male specimen of *A. aglaia*, L., with the spots on the under surface blending ; also a series of *Epinephele hyperanthes*, L., from the New Forest, showing considerable variation.

Mr. C. Fenn exhibited a specimen of the var. *laticornis*, Wilk., of *Tortrix costana*, Fb.. *Eupithecia satyrata*, Hb., var. *curzoni*, Greg. ; *Scoparia ambigua*, Tr., from various localities ; and also *Tortrix viburnana*, Fb., from Darlington, and *T. pallens*, Hb., var. *icterana*, Fröl., from Folkestone, with the ordinary form from St. Margaret's Bay ; and remarked that he had every reason to believe they were all one species, the shape of the wings being identical.

Mr. South mentioned that there were certainly two forms of *icterana*, one which occurred inland in meadows and the other on the coast ; the inland one was certainly greyer than the coast form, but there was no doubt the larvæ were identical ; he had bred it from golden-rod, and there could be no doubt that it was a general feeder.

Mr. Tutt said that anyone working the marshes round Shoeburyness obtained specimens which were closely allied in the males to the females obtained at Folkestone ; but the females at Shoeburyness were much better marked, and he had a specimen of the female with a band right across the wings ; he was clearly of opinion that *icterana* was nothing more nor less than a form of *viburnana*.

Mr. A. J. Croker exhibited *Ditula hartmanniana*, L., from the banks of the river Lea. Mr. Fenn remarked that the species occurred on the trunks of willow trees all round London.

Mr. C. Oldham exhibited a light specimen of *Polyommatus phlaeas*, L., a dark form of *Argynnis euphrosyne*, L., and *Hesperia lineola*, Ochs., from the fens in Huntingdonshire.

Mr. T. D. A. Cockerell exhibited three species of *Cetonia* from Syria, viz., *C. opaca*, Fb., *C. floricola*, var. *ignicollis* (Dej.), Gory and Peach, and *C. impavida*, Janson. With reference to the last-named species, Mr. Cockerell stated that the specimens appeared to be specifically identical with this Indian species, as they appeared to agree in all essential

points with an example in the British Museum, from Aden, named by Mr. Janson. The distribution of the species, therefore, appeared to be India, Aden, and Syria.

Mr. Cockerell also exhibited two examples of *Trichodes* from Syria, one of which he stated apparently agreed with *T. syriacus*, Dej., as described in Spinola's Monograph, but was considerably larger; the other seemed to be a variety of *T. favarius*, Ill.

Mr. C. A. Briggs remarked that *Carpocapsa pomonella*, L. had recently been bred from apples imported from the United States of America, and asked whether it was understood not to be a true native species there.

Mr. Jenner Weir said that he believed the time of its introduction to the States was well known; a great deal had been written with reference to this species, and he had recently received a communication from New Zealand, that *C. pomonella* had arrived there, and was already causing a great deal of damage in the orchards.

Mr. Tutt mentioned that there was very little known as to where the larvæ pupated.

Mr. C. Fenn said that he had repeatedly reared the species from larvæ, and the larva after leaving the apple went into the earth and spun a cocoon, but it did not change to the pupa until the spring; the imagines could be seen flying over the tops of the apple trees at about 8 o'clock in the evening; *Catoptria juliana*, Curt., did not pupate in the earth, but the larva bored into the bark of trees in order to pass the winter.

Mr. West (Greenwich) remarked that he had bred *C. pomonella* from chestnut, walnut, and pear; he had frequently taken the larva from the chestnuts in Greenwich Park. In rearing the species from larvæ he had frequently found them bore into the wood of the cage. In reply to Mr. Fenn as to the time of emergence of *juliana*, Mr. West said that he found they emerged about 10 or 11 o'clock in the morning; he had invariably taken them at this time drying their wings. After the wings were dry, he imagined they rose to the trees, as he had never found them in the afternoon on the tree; he thought it was generally confined to oaks.

Mr. Billups asked whether anyone had noticed the extraordinary abundance of *Vespa vulgaris*, L. During the week, he was on Shirley Heath sweeping, and at every stroke of the net he got eight or a dozen wasps. Mr. Rice mentioned having counted thirty nests within an area of two hundred yards; this was near Ockley, Surrey. Mr. South remarked that the year 1879 was a very similar year to the

present, and wasps were then extremely plentiful all over the country in exactly the same manner as they now were.

Mr. Billups mentioned that while collecting Hymenoptera in company with Mr. Beaumont at Oxshot, Surrey, on the 16th August, they had seen a pair of golden orioles (*Oriolus galbula*, L.). Mr. Cooper said that in August he heard the note of this bird at Sevenoaks, Kent; the bird had bred in Norfolk for the last two years. Mr. Jenner Weir mentioned having heard of a pair at Bagshot, but they did not make any nest.

SEPTEMBER 25th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Mr. Percy Bright exhibited a bred series of *Tæniocampa gracilis*, Fb., from larvæ obtained in the New Forest, comprising dark and red varieties; *Argynnis paphia*, L., blotched with white spots, and var. *valezina*, Esp.; *Argynnis adippe*, L., var. *cleodoxa*, Ochs., the black variety of *Limenitis sibylla*, L., a long series of *Boarmia repandata*, L., including the variety *conversaria*, Hb., from Devonshire, and melanic forms from Sheffield, also forms from Perth and Shetland; a series of *Melanthia bicolorata*, Hufn., var. *plumbata*, Curt., from Rannoch, and a series of *Ænectra pilleriana*, Schiff., the bog form obtained near Bournemouth, and a specimen which had been sent to him by a Mr. Mountford as a variety of *Vanessa urticae*, L., and was stated to have been taken at Polegate, Sussex, in 1888. Mr. Tutt remarked that this specimen appeared to be identical with an American species, which Mr. Jenner Weir said was *Vanessa milberti*.

Mr. R. Adkin exhibited *Myelophila cribrum*, Schiff., and *Homæosoma binævella*, Hb., from the Essex coast, and remarked upon the protection afforded to these two species when resting upon thistles, by their resemblance to the seeds of certain grasses which grow among the thistles and, hanging over, rest upon the leaves in a similar manner to the moths.

Mr. J. Jäger exhibited a collection of macro-lepidoptera made by him during August and September in the Isle of Man, and remarked that butterflies were scarce owing to the want of sunshine. *Cidaria truncata*, Hufn., was fairly common on the trunks of the ash trees, as was *Cirrædia xerampelina*, Hb., at Douglas and Ramsey; this latter species was mostly found among the grass and the fallen leaves, which it much resembled, around the trees; a beautiful dark

form occurred sparingly. The only species attracted by sugaring was *Xylophasia monoglypha*, Hufn.; by light, examples of *Bryophila perla*, Fb., *Luperina cespitis*, Fb., *L. testacea*, Hb., *Anchocelis lunosa*, Haw., were taken, and the larva of *Eubolia cervinata*, Schiff., was common on mallow. The majority of the moths occurred at night on the ragwort flowers, the best species obtained in this way being *Agrotis præcox*, L., *A. simulans*, Hufn., *Epunda nigra*, Haw., the two last being very rare; *Stilbia anomala*, Haw., occurred towards the end of August, about a week later than he had found them in South Wales. *Charæas graminis*, L., occurred on the summit of Snaefell, 2,000 feet high. The larvæ of *Agrotis ripæ*, Hb., were not nearly so common as on the opposite coast of Cumberland in the previous year.

Mr. Carrington, referring to the variety of *Cirræa xerampelina*, said he had, in company with Mr. Nicholas Cook, taken this in the Isle of Man; it was especially sought after, but only four or five of the variety would occur among forty or fifty specimens of the type,

Mr. Jäger also exhibited three specimens of *Callimorpha hera*, L., from South Devon, captured by him 6th and 12th August; he remarked that he was somewhat surprised to find that there was still some doubt as to the authenticity of the recent captures of this species. Mr. Carrington said he had never had any reasonable doubt as to the species occurring in Britain; its range was very considerable, but in this country it seemed extremely local; Mr. Auld and several members had taken it in South Devon; he had no doubt if worked for, it would be found elsewhere. Even if it had been introduced, it evidently continued to breed here, and would therefore now be considered as British. Mr. Tutt pointed out that the locality in South Devon was the extreme northern geographical limit of the species; it was common in the Channel Islands, but as regards Great Britain, it only appeared in Devon and Cornwall. Mr. J. Jenner Weir remarked that there was no reason to suppose it did not occur in other parts of the south coast if energetically worked for.

Mr. S. C. G. Russell exhibited a long series of *Argynnis selene*, Schiff., and of *Zygæna trifolii*, Esp., the latter being especially noticeable for the number of varieties obtained.

Mr. C. Fenn exhibited a series of *Cidaria immanata*, Haw., showing all the varieties generally occurring at Aberdeen, and dark varieties of the same species from York; also *Agrotis cursoria*, Bork., from Aberdeen, showing the extremes

of variation in the species, and a specimen of *Ephestia ficulella*, Bar., taken in the Society's rooms.

Mr. Mera exhibited a well-banded specimen of *Argynnis euphrosyne*, L., taken by himself at Chattenden, Kent.

Mr. Carrington referred to what he had said at a previous meeting as to his recent visit to Ostend, and remarked that he was reported as having found the larva of *Argynnis latona*, L.; this should have been the imago, as it occurred very freely. The object of his visit was to obtain ova for the purpose of studying the life-history of the larva; after a long search he had only succeeded in finding a single egg.

Mr. Percy Bright inquired as to the larvæ of *Lycæna ægon*, Schiff., a species which occurred very freely in the New Forest; but he was unable to find the larvæ. Mr. Carrington stated in reply that Mr. Bryant had been unsuccessful in obtaining the larvæ in May; and he had himself tried to obtain ova, although he had taken many hundreds of the butterfly, he yet failed in getting ova. One of the supposed food-plants was *Genista anglica*, L., and this occurred so sparingly on the racecourse at Lyndhurst, the headquarters of the butterfly there, that it was impossible that it could serve as the food-plant for so large a number as would represent the butterflies. Mr. Weir said that about forty-five years ago the species occurred at Lewes, and there was certainly no *Genista anglica* there. Mr. Barrett pointed out that the species had been reared and described by the late Mr. Buckler. It fed upon *Ornithopus perpusillus* (Bird's foot vetch).

Mr. Carrington remarked on the general autumnal flowering of plants. While on his way to Belgium, he had noticed in Paris, on the boulevards, that the horse chesnuts were in flower for a second time; out of perhaps every hundred trees there were thirty in flower. In England, in some localities, the red poppy was flowering as freely as in the early part of July; between Sutton and Epsom the fields were quite red with the poppy flowers. He had also noticed in gardens, that the cultivated poppies were blooming much more freely than in other years.

Mr. Jenner Weir had noticed exactly the same thing, and had heard of the common ox-lip being in flower. Mr. Billups mentioned that at Peckham there was a horse chesnut that invariably bloomed twice a year. Mr. R. Adkin had noticed the poppies at Birchington, and had also seen the common broom in flower within the last week.

OCTOBER 9th, 1890.

J. T. CARRINGTON, Esq., F.L.S., *President*, in the Chair.

Mr. W. E. Butler was elected a member.

Mr. T. R. Billups exhibited specimens of *Epeolus productus*, Thoms., taken at Chobham in September last. Mr. Billups said that this species, which is one of our prettiest parasitical bees, was mostly to be met with in sandy localities, where species of the genus *Colletes* had established colonies; it is a very indolent kind of bee, and must be handled with caution as it stings acutely. It may occasionally be met with on the ragwort (*Senecio jacobæa*, L.), as also on the mouse-ear hawkweed (*Hieracium pilosella*, L.), where it frequently enjoys a siesta; it has not been taken in the immediate neighbourhood of London, but is plentiful in the lanes of Kent, Surrey, and Hampshire. It has also been taken at Barmouth in Wales, in Suffolk, and Norfolk; but has not been recorded from Scotland or Ireland.

Mr. Billups also exhibited a series of a species of Ichneumonidæ, *Trichoma enecator*, Rossi., bred by Mr. Adkin, its host being *Peronia hastiana*, L., the larvæ of which were feeding in willow shoots brought from the Isle of Man. Also a male and female of the rare Braconid, *Pelecystoma lutea*, Nees; the former bred by Mr. Adkin from the larva of *Tortrix piceana*, L., and two of the latter from larvæ of *Papilio machaon*, L. The Rev. T. A. Marshall, in his monograph of British Braconidæ, said the right of this species to be considered British is established upon two females, one mutilated, in Mr. Fitch's collection, bred by Sang from a doubtful Geometer feeding on fir, either *Ellopiopsis prosapiaria*, L., *Thera firmata*, Hüb., or *variata*, Schiff.; the other from *Heterogenea limacodes*, Hufn., by Raynor on June 22nd: it had been reared on the Continent from the latter host, both by Reissig and Gourea.

Adverting to a specimen of *Vanessa* exhibited at the last meeting, and said to have been taken at Polegate, Sussex, Mr. Jenner Weir stated that, in his opinion, the insect in question was *Vanessa milberti*, a well known North American species, of which he exhibited specimens from the Canadian North-West Provinces, and also specimens of *Vanessa urticæ* from Hong Kong, Lulea in Sweden, and St. Petersburg, showing how very little the species varied in these widely-separated localities, differing also so much as they did in climate: Hong Kong being within the tropics, and Lulea but just outside the arctic circle.

Mr. South exhibited and made some remarks upon *Noctua festiva*, Hübn., and its varieties. The Shetland form of the species, to which the varietal name of *thulei* (? *thules*) had been given, was very different from the smaller mountain and moorland form known as var. *conflua* Treits.; but there were specimens among the Shetland *festiva*, and others among the Scotch mainland *festiva*, which served to connect the two named forms one with the other, and both with the type. At one time, when he had only seen extreme forms from Shetland, he was inclined to consider them distinct from *N. festiva*; but now that he had a more intimate knowledge of the various modifications to which the species is subject, he was quite prepared to accept *thulei* as a form of *N. festiva*.

Mr. Carrington said that some of the specimens reminded him much of some that he used to take at Rannoch, and which he considered were *N. conflua*, Treits., these were easily picked out from *festiva*, as the two forms settled on the sugar in different ways.

Mr. T. D. A. Cockerell exhibited *Colias eurytheme*, Bdv., forms—(1) *amphidusa*, Bdv., (2) *keewaydin*, Edw., (3) *ariadne*, Edw., (4) *eriphyle*, Edw., from the United States. He remarked that these had now been shown to be one species; it was interesting as showing how species might be made, and how circumstances produced a certain form, which in course of time entomologists called a species.

Mr. C. Fenn exhibited *Agrotis simulans*, Hufn., *A. nigricans*, L., *Acronycta euphorbiæ*, Fb., and *Sciaphila octomaculana*, Haw., from Shetland, all showing a tendency to melanism.

Mr. C. G. Barrett exhibited the specimen of *Plusia moneta*, Fab., taken by Mr. Holland at Reading, and expressed an opinion that the species was moving northwards; it was an inhabitant of Eastern and Southern Europe, but within the last few years it had been seen in Belgium and Holland, and there were several records of its being found in this country during the present year: its foodplant was the common monkshood, found in every cottage garden, and it might therefore establish itself here.

Mr. South added that the first recorded specimen was taken flying over *Delphinium* in a garden near Dover; another had been taken at Tunbridge Wells.

Mr. Tutt, on behalf of Lieutenant Brown, exhibited *Agrotis simulans*, Hufn., from Portland, where he stated the species had occurred freely; he called attention to some of the specimens having a well-developed central band, and two of the specimens being of an ochreous colour; the whole series

differed much from Scotch specimens, and to illustrate this Mr. Tutt exhibited specimens from Aberdeen.

Mr. Tugwell exhibited bred specimens of *Heliophobus hispidus*, Hb., and said that in some of the specimens it was possible to see a violaceous tinge. Mr. South remarked that the colour was not so pronounced as in Hubner's figure. Mr. Tutt said he had bred the species, and in none of his specimens was there the faintest appearance of this colour; he did not think that British specimens were identical with Hubner's figure; and if various copies of Hubner's book were referred to, it would be noticed that there were different figures of the same insect.

Mr. Hawes exhibited four specimens of *Argynnis selene*, Schiff., and remarked that they were bred from ova obtained from a female specimen taken near Colchester on the 13th July; the ova were deposited on the 15th, and hatched on the 24th of the same month, passed through four moults, and the four now shown pupated from 25th August to 5th September; the first emerging on the 7th and the last on the 14th of the latter month. Some slight discussion ensued, and it was generally stated that occasional specimens of a second brood were now and then met with.

Mr. H. Moore exhibited nests and imagines of the following species of Hymenoptera:—*Eumenes pomiformis*, Rossi., from Zante; *E. petiolata* from China; *Polistes gallicus*, L., from Carthage; *P. instabilis* from Nassau; *P. carnifex* from Trinidad; and *P. pallipes* from Bermuda. Two species of *Polybia* from Demerara, and some cells of *Pelopæus fistularis*, built on a piece of copper wire.

Mr. T. D. A. Cockerell exhibited living examples of *Helix fruticum*, Drap., collected by Mr. S. C. Cockerell at Troyes, France.

OCTOBER 23rd, 1890.

W. H. TUGWELL, Esq., Ph.C., *Vice-President*, in the Chair.

Messrs. P. J. Crane and G. Wallace were elected members.

Mr. C. S. Bouttall exhibited two series of *Eugonia quercinaria*, Hufn., bred from ova, one batch of which were fed on elm, and the other on willow; those fed on elm, after the first moult, were by accident kept without food for a short time, in consequence most of the larvæ died; but nineteen reached the perfect state, of which two only were females. He suggested that the males might be more tenacious of life than the other sex.

Mr. Percy Bright exhibited *Triphæna orbona*, Hufn.

(*subsequa*, Hb.), from Forres, and remarked that Mr. Salvage had taken this species very freely there, getting as many as sixty in one evening; he also exhibited a melanic variety of *Arctia caia*, L., from Sheffield, and an exceedingly light form from Darlington.

Mr. Hawes exhibited four examples of *Argynnis euphrosyne*, L., showing considerable variation in the black markings.

Mr. R. Adkin exhibited specimens of *Tortrix piceana*, L., from Surrey and Hampshire localities, fifty or sixty miles apart; and he expressed an opinion that the species, although exceedingly rare, was more widely distributed than was generally supposed. Mr. Tugwell said it had been taken in Tilgate Forest, Sussex. Mr. C. G. Barrett said it was extremely abundant on the Continent, and that collectors there could hardly believe that we did not obtain it plentifully.

Mr. Barker exhibited examples of a second brood of *Argynnis selene*, Schiff., taken at Hastings during the last week of August, 1881. He stated that during the previous week, although frequently over the same ground, he had not seen a single specimen; but on visiting the spot on the 29th and 30th, he found them in fine condition and flying in abundance; they were confined to the slope of the hill beyond Fairlight Glen; the species then being new to him he took in two days some sixty specimens, and could have taken some hundreds had he been disposed to do so. Mr. Tugwell said it was pretty generally known that the species was occasionally double-brooded. Mr. C. G. Barrett remarked that it was only so in very warm places; he had only met with a single specimen of a second brood at Haslemere.

Mr. T. D. A. Cockerell exhibited a cocoon of *Zygæna filipendulæ*, L., from near Leigh, Essex, not uniformly yellow, remarking that sometimes the cocoons of this species were half yellow and half white or whitish.

Mr. Cockerell also exhibited *Myzias sexcincta*, Fab., from Long Island, and said that this species was found by Dr. Riley in the stomachs of sparrows (*Passer domesticus*) in thirty instances, thus showing that its wasp-like attributes did not protect it from that bird; also a Tipulid fly allied to *Tipula*, but apparently belonging to a new or little known genus, from Swift Creek, Custer Co., Colorado, where it mimics a species of Ichneumonidæ found in the same locality.

NOVEMBER 13th, 1890.

W. H. TUGWELL, Esq., Ph.C., *Vice-President*, in the Chair.

Messrs. G. Champion, A. J. Hodges, and A. J. Hill were elected members.

Mr. Wellman exhibited specimens of *Bryophila impar*, Warren, from Cambridge, and a specimen of *B. muralis*, Forst., from Folkestone, closely resembling the specimens of *impar*. Mr. Tugwell said that in his opinion *impar* was nothing more than a local variety of *muralis*, and certainly the Folkestone variety was characteristic of the so-called *impar*.

Mr. Tugwell exhibited long series of *Cerastis vaccinii*, L., and *C. spadicea*, Hb., to show what appeared to him to be the gradual merging of the two forms or species; it would be noticed in the series that the two ran so close that it was practically impossible to separate them, that although we had no difficulty in distinguishing well-marked examples, others ran into intermediate forms difficult to separate. Mr. South said that *spadicea* was a form of *vaccinii*, and was figured by Hubner; but the form known here as *spadicea* was known on the Continent as *subspadicea*, which was said to be a form of *C. ligula*, Scop. Mr. C. G. Barrett remarked that he had no difficulty in separating one from the other, the chief distinctions being in the shape of the forewings; those of *vaccinii* being broad, obtuse, and dilated at the anal angle, those of *spadicea*=*ligula* narrower, and sharply angled at the apex.

Mr. R. Adkin exhibited *Peronea sponsana*, Fb., from the New Forest, and referred to his exhibit of this species in 1889, when nearly all shown were the variety *tristana*, Haw. At the time some observations were made that usually this variety only occurred sparingly among the ordinary form; this year he had endeavoured to get the insect as it occurred in the Forest without having them picked; and out of some twenty specimens, all that were taken, only four or five were the variety, and they gradually approached the type; none of the specimens were exactly like those taken the previous year.

Mr. R. Adkin also exhibited examples of *Spilosoma mendica*, Clerck., bred from ova obtained by the pairing of a female of the Irish form (var. *rustica*, Hb.) with a male of the English variety of the species; from the ova obtained only two moths were bred, both of which were males, and neither of them were like either the English or Irish form.

Mr. Henderson exhibited eggs of the Great black-backed

Gull (*Larus marinus*, L.), and of the Lesser black-backed Gull (*L. fuscus*, L.), and remarked on the differences between the eggs and the habits of these two birds.

Mr. T. D. A. Cockerell exhibited insects from the Wet Mountain Valley, Colorado, to illustrate parallel variation in Diptera and Hymenoptera.

Series 1. Green to blue (metallic colours).

Series 2. Yellow to red (pubescence).

Mr. T. W. Hall mentioned that this year he had obtained 140 or 150 larvæ of *Eupithecia albipunctata*, Haw., but only succeeded in getting 28 pupæ, the remainder of the larvæ being ichneumonised.

Mr. Tugwell referred to the larvæ of *Cucullia gnaphalii*, Hb., as being exceedingly liable to be attacked by ichneumonidæ.

References were made to the great abundance of larvæ in the gardens of suburban London, *Spilosoma lubricipeda*, Esp., *S. menthastri*, Esq., *Mamestra brassicæ*, L., and *M. persiciaræ* L., being particularly specified.

NOVEMBER 27th, 1890.

W. H. TUGWELL, Esq., Ph.C., *Vice-President*, in the Chair.

Mr. A. J. Hodges exhibited a specimen of *Leucania vitellina*, Hb., taken Sept. 26th, 1890, also *Caradrina ambigua*, Fb., both from the Isle of Wight.

Mr. W. H. Tugwell exhibited long series of *Triphæna comes*, Hb., showing great variation. The series comprised English and Scotch forms, some of the Shetland forms being especially noticeable; also *T. orbona*, Hufn., English and Scotch, and remarked that this was a species much more stable in coloration than *T. comes*.

Mr. R. South exhibited examples of *Melanippe fluctuata*, L., from various localities, and called attention to the var. *costovata*, of Haworth, a variety which was not unfrequently met with, more especially round London; he also called attention to an unusually large specimen from Scotland, and referred to Millière's figure of the variety known as *neapolisata*, expressing a doubt as to the occurrence of this variety in Britain.

Mr. Short exhibited three examples of *Spilosoma fuliginosa*, L., from Aberdeen, much larger and paler than those usually seen from the North; also *Lobophora viretata*, Hb., bred from ova received from the Birmingham district, and stated that he occasionally took single specimens in the neighbourhood of Highgate. Mr. Tugwell said it did occur now and then

in the London district, and Mr. South said it was found freely at Brighton.

Some remarks having been made as to many of the specimens being of an ochreous colour, Mr. Short said that when they emerged from the pupæ they were in many instances of this colour, and it was not due to the manner in which they were killed. Mr. South and other members stated that the species frequently emerged of a yellowish colour, with no trace whatever of the green.

Mr. R. Adkin exhibited a series of *Spilosoma menthastris*, Esp., bred from ova received from the north of Ireland, the whole of them having the wings of a distinct brownish tinge of colour, and the wing rays paler, a characteristic which was common to both sexes; they also varied very much in the arrangement of the spots. He remarked that he understood this was the prevalent form in the district. Mr. Tugwell said these specimens were very similar to those from the neighbourhood of Perth.

Mr. Billups exhibited two fine specimens of Coleoptera belonging to the family Passalides, viz., *Aceraius grandis*, Burm., from Java, and *A. camptoni*, Burm., from Ceylon; also numerous species of Diptera taken by himself during the past season; and called attention to the very beautiful markings in the wings of many of the species. Amongst others, there were specimens of *Tetanocera ferruginea*, Fln., *T. elata*, Fln., and *T. punctulata*, Scop.; *Acidia cognata*, W., and *A. heraclei*, L.; *Spilographa zoe*, Meig., *Pteropæcila lamed*, Schrk., *Euaresta conjuncta*, Lw., *Tephritis bardanæ*, Schrk., *Palloptera arcuata*, Fln., and *P. trimacula*, Mg., *Balioptera combinata*, L., *Limnia marginata*, F., *Sapromyza decempunctata*, Fln., *Platystoma seminationis*, Fln., and *Pteropæctria afflicta*, Mg.

Mr. E. Step, for Mr. C. A. Briggs, exhibited two or three species of Fungi. One of these, *Lentinus leontopodius*, he believed, had not been shown at the Society's meetings before. He had obtained it from sallow trees at Putney.

DECEMBER 11th, 1890.

W. H. TUGWELL, Esq., Ph.C. Vice-President, in the Chair.

Mr. R. South exhibited *Lycæna astrarche*, Bgstr. and its named forms, and made some remarks on the variation and distribution of the species, of which the following is a summary: The form known as *allous*, Hübn., has the upper surface of all the wings uniform brown, without any trace of orange marginal markings; on the under surface the orange spots are often almost entirely absent, but are sometimes well

developed. This form occurs as a variety in the summer brood in Central and Southern Europe, and in North Africa, but appears to be of more constant occurrence in the Ural mountains. It has also been found in India.

Artaxerxes, Fab. has a white spot on fore wing in both sexes, and often there are no orange spots on the upper surface of the male; on the under surface the black spots are obsolete.

Salmacis, Steph. The male of this form has no orange spots on upper surface of the fore wings, and on the under surface the black spots are very small; the female has the white spot of *artaxerxes* on the upper surface of fore wings. This form is known as the "Durham argus," but all Durham specimens of *astrarche* are not of this form, some of them vary in the direction of *artaxerxes* to a greater degree than the form named and described by Stephens, whilst others, the majority, are more or less typical *astrarche*.

A form of *astrarche* occurs in the Canary Islands with very broad and bright orange bands on both wings. This form is occasionally found, somewhat modified, in Europe, and even in England. Regarding the variation of the species in connection with its distribution, we find that development of the orange markings increases in direct accord with the insect distribution to the southward, and this ornamentation becomes most complete in the Canaries.

Specimens with the black discoidal spot on forewings, encircled with white, have been observed in South England, and other parts of Europe, but this is the nearest approach we have to the whole spot of *artaxerxes* and *salmacis*.

Lycæna astrarche occurs in all parts of Europe, except the Polar Regions; it is found in North Africa, Canary, Asia Minor, Kouldja, Askold, Amurland, the Altai, the Western Himalayas, Kashmir and Ladak. In some parts of its range in India, *astrarche* (alias *nazira*) is found at elevations of from 6,000 to 10,000 feet.

Mr. R. Adkin exhibited *Peronia hastiana*, L., bred from larva received from the Isle of Man, the prevailing form being of a bone colour; also *Hepialus sylvinus*, L., taken in Kent, and called attention to a peculiar habit of the species of hanging from the herbage when in copula, which gave the specimens the appearance of a dead leaf swinging about in the herbage. Mr. Tugwell remarked that occasionally the females of the genus *Hepialus*, were met with very much larger than the ordinary examples, notably *H. velleda*.

Mr. Tugwell exhibited typical forms of *Eupithecia satyrata*, Hb., both from English and Scotch localities; also the vars.

callunaria, Sta., and *curzoni*, Gregs.; also five examples of a species of *Eupithecia* from Renfrewshire, ordinarily looked upon as a var. of *satyrata*; he could not think they were referable to this species, but on looking at them carefully he thought they might be *E. albipunctata*, Haw., but should not like to express a definite opinion. Mr. Hall thought they were the last named species. Mr. C. G. Barrett remarked that he had a strong impression on his mind that they were not of so bright a black as the black variety of *E. albipunctata*, known as *angelicata*, Bar. He had had specimens of the Paisley insect sent him for naming; and although he found *castigata* was very near to it, he thought that he had returned it as possibly *trisignaria*, H.-S., although he was not strong in this opinion.

Mr. Tutt said it was difficult to correctly name an insect from an isolated specimen with no data as to its history; in his opinion the specimens were referable to *virgaureata*, Dbld., and they were sent out with *virgaureata* from Perth. Mr. Fenn said he was inclined to agree with Mr. Tutt, that they came nearer to *virgaureata* than to any other species; he had never heard of *trisignaria* so far north as Scotland.

Mr. Billups exhibited specimens of Diptera bred by members of the Society from the following Lepidopterous larvæ: *Masicera sylvatica*, Fln. by Mr. Fenn from the larvæ of *Saturnia pavonia*, Schiff. Mr. Winkley had also bred the same species from *Pieris brassicæ*, L. *Phorocera concinnata*, Mg., in some numbers by Mr. Frohawk, from the larva of *Vanessa urticæ*, this species also falling to Mr. Winkley's lot from *Pieris brassicæ*. *Nemoræa notabilis*, Mg. bred from the larvæ of *Plusia festuæ*, by Mr. Wellman. *Tachina tibialis*, Mg., had been bred from *Vanessa urticæ*, by himself, and *Trixia variegata*, Mg., from larvæ of *Cheimatobia boreata*, Hb., by Mr. South. Mr. Billups also called attention to three beautiful specimens of the rare dipteron *Oxycera terminata*, Mg., one of which he had bred from a pupæ found in his own garden, Dulwich, in August, 1889; the other two being captured in the same locality in August of the present year. He also exhibited several species of Hymenopterous parasites, which were parasitic on the eggs of Lepidoptera and Diptera; amongst others minute but beautiful specimens of *Telenomus phalænarum*, Ns., *Telenomus nitidulus*, Thom., *Prosacantha brevicornis*, Thom., and *P. brachyptera*, Thom., *Platygaster nigra*, Hal. and *P. scelinodis*, Hal., *Gonatocrus pictus*, Hal., *Monelata parvula*, Nees., *Inostemma boscii*, Walk., and many others too numerous to mention.



EXPLANATION OF MAP.



This Map is intended to illustrate the passage of the migratory swarms of *Vanessa cardui*, observed in 1879, an account of which is given at page 73, and to show the position of the lighthouses mentioned in the "Migration Reports" mentioned at page 64.

The names of months and places printed in white in proximity to each other indicate the times at, and districts in which, *Vanessa cardui* was first observed in unusual abundance.

The same accompanied by arrows indicate the times and places at which migratory swarms of *V. cardui* were observed, and direction of flight.

The white crosses indicate the districts in which *V. cardui* was subsequently observed in unusual abundance.

The red stars indicate the position of the lighthouses referred to in the "Migration Reports."

On the Occasional Abundance of Certain Species of Lepidoptera in the British Islands.

By Mr. R. ADKIN. *Read April 24th, 1890.*

Anyone who has paid attention to the lepidoptera of the British Islands, will have noticed that many species are far more abundant in some years than in others; that those usually accounted rare are occasionally to be found in considerable numbers, while others that are recognised as generally common, appear from time to time in utmost profusion. These cases of abnormal abundance are generally confined to a limited number of species at one time, some one or possibly two being simultaneously affected, and it often happens that at such times lepidoptera generally are less common than usual; the area also to which they extend is sometimes very circumscribed, but at others, includes the whole of the British Isles, and even the Continent of Europe; indeed, there appears to be good ground for believing that large districts of the palæarctic region are at times simultaneously affected.

The question that will naturally present itself to our minds is, what are the causes of these times of unusual abundance? The subject has already received a large amount of attention, and numerous theories have been advanced to account for the phenomenon; these may be grouped into two great classes, which we may, for convenience, term the "migration," and the "local causes" theories; I propose, after first glancing at the probable origin of our present lepidopterous fauna, to briefly investigate the evidence which we have at our disposal bearing upon the one and the other.

The British Isles as we now know them, are made up of two main and sundry smaller islands, having altogether a superficial area of some 121,000 square miles; they lie for the most part between the 50th and 60th degree N. latitude, adjacent to the flow of the Gulf Stream, and enjoy a temperate climate. But such favourable conditions were not always existent; at some former period this country was a land of snow and ice, probably not differing much from what Greenland now is, and the majority of our present species of lepidoptera could not have lived under such climatic conditions. It is probable that at this time these islands formed a portion of the Continent of Europe, and that upon the glacial conditions giving way to a period of milder temperatures, a fauna suitable to the altered

circumstances of climate would follow on. If we compare our more generally distributed species with those inhabiting Continental Europe, we find the majority of them are identical, and we arrive at the conclusion that they are of common origin, and that we owe our present insect fauna to a gradual extension of range from that direction. This would appear to indicate an initial migratory condition which it is easily conceivable would be subject to such modification as became necessary from time to time in the economy of a species, and the cutting off of the British Islands from the mainland of Continental Europe cannot be regarded as imposing an obstacle that would not be easily overcome by migratory instincts thus engendered.

If, however, the sphere of our observations is confined entirely to these islands, we have great difficulty in detecting cases of probable migration that may not be referable to other causes; but if we find insects moving in numbers, in situations that preclude the possibility of their presence being the result of any influences of the immediate neighbourhood in which we find them, we can arrive at no other conclusion than that they have migrated from some other position. A very striking case of this description has recently been recorded (*E.M.M.* xxii. 12). The sailing vessel "Pleione" was on a homeward voyage from Wellington (N.Z.), not having touched at any later port, and on March 27th, 1885, when in lat. $0^{\circ} 47''$ N., long. $32^{\circ} 50''$ W., almost in mid-Atlantic, she was surrounded by a perfect swarm of *Deiopeia pulchella*, L., many of which came on board; her position at the time was 260 miles W.S.W. of the barren islet of St. Paul, 440 miles N.E. of the nearest point of the American coast, and 960 miles S.W. of the nearest land where this species is known to occur, the Cape de Verde Islands. We have also many other similar records extending over various parts of the world, and up to our very shores; for instance, *Vanessa cardui*, L., and *Diadema bolina*, Bdv., have been taken on board ship 200 miles off Cape de Verde Islands (*Entom.* iii. 326); and *Acerontia atropos*, L., flew on to the ship "Cameron" when passing the same place (*E.M.M.* xiv. 185). This latter species has also been observed between Algiers and Gibraltar, at the mouth of the English Channel (*E.M.M.* xviii. 295); off the Irish coast some twenty-five miles out at sea (*E.M.M.* x. 300); seven miles off Harwich, etc. (*E.M.M.* xii. 271). *Macroglossa stellatarum*, L., was seen daily flying about a steamer between Malta and Gibraltar, and again two days before reaching Plymouth (*E.M.M.* xviii. 295); *Pieris*

brassicæ, L., *P. rapæ*, L., *Vanessa cardui*, L., *Plusia gamma*, L., *Nomophila noctuella*, Schiff., and many other species have been noted in greater or less numbers under similar circumstances. *Leucoma salicis*, L., was in 1878 observed many miles at sea off Harwich, at which place they subsequently appeared in thousands, and were seen resting on the fronts of buildings facing the sea in hundreds on the day of their arrival (*E.M.M.* xi. 269). Then we have the reports furnished by the keepers of various lighthouses and light-vessels, to the committee appointed by the British Association for the Advancement of Science, for the purpose of obtaining information on the migration of birds. Although the avowed work of this committee deals only with birds, sundry reports upon insects have been furnished through the courtesy of their secretary, Mr. Cordeaux; and although those referring to lepidoptera are not numerous, their importance cannot be over-estimated; they are to the following effect:

Hanois Lighthouse, to the west of Guernsey, the extreme westerly point of the Channel Islands, in a direct line between the N.W. coast of France and the S.W. coast of England; "1882, June and July flights of *Plusia gamma*, L." "1885, September 13th. Wind S.E. Sky cloudy. Silver gamma moth all evening round lantern." "1886, October 31st, 8 p.m. A quantity of silver-gamma moths, also a few brown ones, but smaller than the gamma."

Fastnet Lighthouse, eight miles out at sea, on the coast of County Cork. "1883, November 2nd. Weather hazy. Number of large moths, comparable only to a fall of snow."

Rhymes of Islay Lighthouse. Situated on a rock off the south-westerly point of one of the west Scottish islands, and due north of Ireland, whence it is distant some thirty miles. "1885, night of September 7th, hundreds of moths flying about lantern."

Heligoland Lighthouse, on the east point of the island facing Denmark, which is the nearest mainland, and distant about thirty miles from it. "1883, August 6th to 7th, wind S.E., considerable flight of silver-gamma moth (*Plusia gamma*, L.), but nothing compared with the perfect "snow-storm of this moth that passed in the autumn of 1882, all going west." "October 11th, wind S.S.W., there was a large flight of *Hybernica defoliaria*, Clerck., mixed with *H. aurantiaria*, Esp.; and also during the nights of the last week in October repeated flights of these moths." "1884, night of July 2nd to 3rd, thousands of *Plusia gamma*, L.," "night 21st to 22nd, great numbers of *Bombyx neustria*, L., east to

west;" "22nd to 23rd, the same;" "27th to 28th, numerous flights passing on."

Fiddra Lighthouse, on an island off east coast of Scotland. "1886, August. Moths everywhere after darkness set in, some very large and beautiful, and so numerous that they had to be swept down with a towel."

Would Light-vessel, ten miles off Happisburgh, on the Norfolk coast. "1884, June 7th, 4 p.m. Wind S.S.E. One Death's-head moth caught alive, several small white moths rested."

However incomplete these reports may be, they appear to prove most conclusively that moths do move to long distances and in considerable numbers. Some of the lights, it is true, are sufficiently near to the shore to admit of the probability of the moths frequenting their lanterns, having been attracted thither from the adjacent land; but the very distinct reports from Heligoland admit of no such interpretation, the "numerous flights passing on" clearly indicate masses in a migratory condition, and the westerly course that they were taking would bring them directly to these islands; and if so weak-winged an insect as *Deiopeia pulchella* could reach the middle of the Atlantic Ocean, the 300 miles intervening between Heligoland and the British Islands would form no obstacle to a safe arrival of its hardier brethren on these coasts; nor can we suppose that the narrow limits of the English Channel would form a barrier to immigration from the countries to the south of us.

But other causes have been suggested to account for the cases of abnormal abundance that we are investigating. The insular position of our islands possibly engenders insular prejudices in the minds of many of their inhabitants, and this has perhaps led to many of the theories that have from time to time been advanced without any sufficient evidence to support them; nevertheless, many suggestions have been made that are worthy of the most careful investigation. This is particularly apparent when we recognize the great fecundity of many species, and yet the comparatively small percentage that ever reach maturity. A ♀ *Dicranura vinula*, L., has been found to contain 268 eggs; *Smerinthus ocellatus*, L., nearly 400. I have counted a similar number deposited by *Nyssia hispidaria*, Fb., and *Biston hirtaria*, Clerck., is known to be even more prolific; yet we do not find an annual corresponding increase in the number of imagines of these species, their natural enemies hold them in check, and maintain a balance of power. If, therefore, we are to account

for the cases of occasional abundance by *purely* local influences, we must find some irregularity in the working of nature. One theory that has found considerable favour is the laying over of the insect in one of its quiescent stages for an unusually prolonged period. With regard to the first or egg stage, what little evidence we have is not favourable to such a conclusion; we find that if ova do not hatch at their appointed time, they do not do so afterwards; and experiments that I have tried gave a confirmatory result. But it is known that many species do pass a prolonged period as pupæ; of this a multitude of instances are on record; of the Sphingidæ and Bombyciidæ, a portion of the brood frequently remain in pupa until the second and sometimes the third year. *Eriogaster lanestris*, L., is particularly prone to doing so, and often remains several years; but it has been found that the number of emergences is smaller each year, and indeed the only case that I have been able to discover tending in an opposite direction is that of a portion of a brood of *Asteroscopus nubeculosa*, Esp.; of these some twenty larvæ went to earth at the end of June, 1881, and no moths emerged until March, 1884, when one male and four females were bred; but it must be borne in mind that these were kept under artificial conditions, and therefore protected from their natural enemies, and that under such favourable circumstances the percentage produced can hardly be regarded as large; and that in a state of nature the longer an insect remains in pupa so much greater are the risks of its falling a victim to the numerous enemies that beset it; therefore the probability of any exceptional abundance being due to such a contingency is exceedingly remote.

But perhaps the most important suggestion with regard to the local causes theory is that of the possible effect of meteorological conditions. We are told that mild winters and cool summers are detrimental to Lepidoptera, while hard winters and sunny summers are favourable, and that excessive wet is fatal to many species in their earlier stages, and so on. Observation appears to prove that such is the case; but would not such causes affect Lepidoptera generally, rather than a few species? It is worthy of remark that some of the cases of greatest abundance, *Vanessa cardui*, L., and *Plusia gamma*, L., for instance, have occurred in cold wet seasons, when other species have been actually much less common than usual. I propose to refer to this again hereafter, and in the meantime to dispose of a class of cases that it appears to me will be more aptly taken here. There are few of us,

I apprehend, who have worked the woods and forests in the spring of the year, who have not occasionally noticed trees or sometimes small tracts of the woods completely devastated by larvæ; thus we find that in 1864 a portion of Epping Forest, nearly a mile in length, was subjected to the ravages of the larvæ of *Cheimatobia brumata*, L.; the air beneath the trees was full of the silken threads by which the larvæ had lowered themselves when shaken off the branches by the breeze, and the plants and even the fallen leaves upon the ground were devoured by them (*E.M.M.* i. 243). In the same year in some of the woods near Cockermouth, in strips of the woods some two or three hundred yards wide, the leaves of every tree were consumed by the larvæ of our common autumn moths, thousands of them dying for want of food, the species being chiefly *Oporabia dilutata*, Bork., *Hybernica defoliaria*, Clerck., *Cheimatobia brumata*, L., and *C. boreata*, Hb. (*Entom.* ii. 152). In 1872, in a wood near Plymouth, large patches of oaks were similarly defoliated, the marauders in this case being *Tæniocampa stabilis*, View., *Hybernica defoliaria*, Clerck., *Oporabia dilutata*, Bork., and *Cheimatobia brumata*, L. (*Entom.* viii. 12). And the larvæ of *Hybernica defoliaria*, Clerck., are accredited with being the chief offenders in similar depredations committed in the New Forest in 1881 (*Entom.* xiv. 178). The oaks and hazels in the woods near Sheffield were completely denuded of their foliage in 1888, the offending larvæ being chiefly *Hybernica marginaria*, Bork., and *H. aurantiaria*, Esp., with a few *Phigalia pedaria*, Fb., and *Oporabia dilutata*, Bork. (*Entom.* xxi. 212). I shall never forget a sight of this sort that I witnessed on one of my earlier visits to Chattenden Roughs; many of the oaks were literally stripped of their leaves, larvæ were hanging in hundreds, aye thousands, from their bare branches, and hurrying about on the ground beneath them; and upon examination I found them to be referable almost without exception to the species of the genus *Hybernica*, Latr., and chiefly *H. defoliaria*, Clerck. On a more recent occasion I found a row of wych-elms, near Loughton, to be treated in a like manner by the larvæ of *Cheimatobia brumata*, L., and in West Wickham wood I have observed oak trees similarly treated by larvæ, chiefly *Hybernica defoliaria*, Clerck., *H. aurantiaria*, Esp., and *Cheimatobia brumata*, L., together with a few *Phigalia pedaria*, Fb., and an occasional *Tæniocampa stabilis*, View., and *T. pulverulenta*, Esp. In 1881 *Orgyia antiqua*, L., was unusually abundant in London, the lime trees between Buckingham Palace and

Marlborough House were in many cases denuded of their leaves, and others had large branches served in the same way, some of the thorns in the parks were also attacked. The moth had been very common at Lewisham in 1880, but was not so in the previous year (*Entom.* xiv. 178).

From the foregoing, three things will be noted: firstly, the districts affected are all of small area, and not of general distribution throughout the country; secondly, the abundance occurred in the larval stage; and thirdly, that the species affected are almost without exception those having apterous females. This last fact appears to explain the first two, wingless moths could not be expected to move to long distances, hence it is probable that any abundance resulting from conditions controlling them would be limited in area, and the first we should see of it would be in the larval state; it is true that at times the moths also are unusually abundant, but so far as I have been able to ascertain these cases of abundance of larvæ have not always been the immediate forerunners of a corresponding abundance of imagines; indeed, it appears that the reverse would probably be the case, the rapacious appetites of the multitudes of larvæ often causing their destruction; and in addition to this I have noticed that with the abundance of the larvæ there has been a corresponding increase in their parasitic enemies. This was very apparent in the case cited from Chattenden, where ichneumons were literally in thousands; and many of the bright green larvæ of *Oporabia dilutata* taken from the denuded oak trees at West Wickham had their conspicuous white ova attached to them. This does not, however, account for the abundance, but rather for its sudden check; yet considering the question of these wingless creatures as a whole, we might well ask whether, if we can account for their sudden decrease by apparently local detrimental influences, the reverse of such conditions would not be a correct solution of an equally sudden increase in their numbers? But we have one piece of direct evidence that must not be overlooked; the report from Heligoland lighthouse distinctly mentions large flights of *H. defoliaria*, etc. Need we then wonder that the *moth* is sometimes abnormally common here; and although I do not for one moment suggest the presence of any of the wingless females in these advancing swarms, it is far from improbable that the arrival of numbers of the opposite sex would materially affect the status of the species here, and possibly become an important factor in the occasional abundance of larvæ that

we have noted. But there are other species that it will be necessary to refer to before we attempt to draw conclusions.

Pieris brassicæ, L., as we all know, is one of the most generally distributed of the British butterflies; it occurs more or less plentifully in all parts of the United Kingdom, and its range extends throughout the Continental area, excepting only the polar regions; indeed, we are so accustomed to regard it as a common insect, that we are apt to attach but little importance to its appearance in increased or diminished numbers; but its abundance has on rare occasions been so great as to actually thrust itself upon our attention.

This was the case in 1887, and as a consequence we find some few records regarding the species; from these it would appear that in the autumn of the previous year the larvæ had been somewhat abundant in some parts of Sussex, but we fail to hear that the imago was so in the spring of 1887 as we might have expected it to be. As the year progressed we again had reports of the local abundance of the larva, now from the east of London and the north-east of Ireland, as well as the Sussex localities; and with the approach of August the imago was suddenly swarming throughout the south and midlands, and in many parts of the north, but by the following spring (1889) the wave of abundance had passed and we found that the species was not then unusually common. This is no doubt but an example of what is frequently taking place; and looking at it as it stands, and taking into account the particularly warm dry summer of the year, we appear to have sufficient reasons for attributing the abundance to local reasons; but we must not shut our eyes to other possible agencies.¹

Mr. C. G. Barrett tells of a perfect swarm of this species that he fell in with on the very coast at Hunstanton, although he had seen but a casual specimen or two on his way thither from Lynn, nor did he find them in any such numbers further inland, and he concluded that he had come upon a troop of immigrants before they had had time to disperse; this was at the end of May, 1887 (*E.M.M.* xxiv. 85). In previous years we also find some few notes of the movement of large numbers of this species; for instance, they have been observed coming into the North Lincolnshire marshes across the Humber from the Yorkshire coast, some four and a half miles distant; the flight is said to have resembled snow-

¹ It is worthy of note that although *Pieris brassicæ* and *P. rapæ* were so abundant, *P. napi* was less common than usual, and appeared to be almost absent from many districts where it usually occurs in some numbers.

flakes, and to have continued for fully an hour against a fairly fresh breeze, the insects constantly passing inland on their arrival (*Entom.* vii. 161). A similar flight had previously been noted.

Swarms of *Pieris brassicæ* have been encountered in the North Sea, during an excursion on board a fishing boat from Bremer-haven. So long as the boat was in the river, or at its mouth, only an occasional specimen was to be seen crossing the river and soon disappearing; but when once out at sea, the boat was enveloped in a swarm of these butterflies, so thick as to resemble a snowstorm (*E.M.M.* ix. 246).

An account is also given of a swarm of white butterflies being overtaken in the English Channel by a vessel on its homeward journey from Havre, and is thus described: "We seemed to suddenly plunge into a swarm, or snow-shower, of common white butterflies, and so continued for nearly an hour; they literally covered us, circling round, and playing up and down the vessel" (*E.M.M.* vii. 18).

Then again, we have an instance of observed immigration on the Sussex coast, and witnessed from Shoreham pier. The day is described as hot and still, with an occasional *P. brassicæ* flying in, when, on the setting in of the afternoon flood-tide, there came a host of them direct from the sea from a south-westerly direction, and settled on the coarse grass along the shore, whence they afterwards rose in myriads upon being disturbed. It was noticed that some of these butterflies, before arrival, settled for a time on the sea, and rose again after resting, a habit which appears to be not infrequent with this species (*Entom.* ii. 289).

Let us, however, leave this species, and glance at another that stands in a somewhat different category:—

Colias edusa, Fb., although by no means generally common in Britain, has occurred at intervals in considerable abundance throughout the country. This has given rise to an enormous mass of recorded evidence with regard to it, and an equally large amount of speculation as to the causes of its irregular appearance. It was, at one time, suggested that some mysterious agency produced it in abundance every seven years; but an examination of the dates of the appearances during the present century showed that to be a mere imagination in the minds of its propounders, and the possibility of the ova being introduced into this country with French clover seed may be regarded as equally unreliable. It will be seen, on looking at the dates when it has been common, that they are very irregular. It was abundant in 1804, 8, 11,

26 and 43; very common in 44, 57 and 58; and very abundant in 59; then scarce in 60 and 61; common in 62, 65, 67, 68 and 69; then scarce in 70 and 71; common again in 72; then apparently altogether absent in 73 and 74; but very common in 75; common in 76; and swarming throughout England, Wales, and South Ireland in 1877, extending even as far north as Perthshire. In 1878, however, the only records are some ten or twelve specimens from our most southern counties in spring, and solitary instances in autumn from similar situations, the one exception being Freshwater, in the Isle of Wight, where about a dozen were observed. In 1879 it was fairly common at Folkestone and Dover, but scarce or absent elsewhere. In 1880, 1 and 2, very scarce; in 1883 some few were noted at Bournemouth and in the Isle of Wight; but it was scarce elsewhere. In 1884 and 5 it was fairly common in some of the southern counties, particularly in the latter year. 1886 and 7 gives us some few records, chiefly from the southern counties; 1888 the same; and last year, although we do not find that it was particularly common in the south, we have records of some twenty from Liverpool, where it had not been seen since 1877, and several from the south coast of Aberdeen; while occasional specimens were taken in Staffordshire, Yorkshire, etc.

It is worthy of remark that, in 1877, when this species was so excessively abundant here, we find, on the authority of Mr. McLachlan and Prof. Meldola, that there was no corresponding abundance throughout Belgium, that it was not seen at Hamburg, and that but few specimens were observed in the neighbourhood of Paris. We also find that the abundance noted in this year (*E.M.M.* xiv. 64, 65) followed on an exceptionally mild winter, that the early emergence was somewhat plentiful, and the specimens in unusually fresh condition. The summer was also warm and fine, the conditions throughout being favourable to the development of a species inhabiting the warmer parts of the palæarctic region.

The geographical range of this species, so far as concerns the countries adjacent to these islands, is North-West Africa, Southern and Central Europe; in other words, it inhabits the warmer parts, and captures even so far north as Aberdeen and Perth can only be regarded as accidental, and would appear to indicate an exceptional northern movement. As to any observed migratory movement, we have but scant information, beyond that a few specimens have been, from

time to time, noted at sea in the English Channel, but of nearly allied species of the same genus undoubted migratory columns have been observed.

There is yet one other butterfly that I must refer to. As a cosmopolitan species, *Vanessa cardui*, L., perhaps takes the first rank, its geographical distribution embraces nearly the whole surface of the globe, stopping short only at the polar regions; in this country it is of universal distribution, but its appearance is by no means certain. Occasionally it is one of our commonest butterflies, while at others it is conspicuous by its almost total absence. We, moreover, find that frequently after its scarcity or absence in the autumn and early spring months, we are suddenly surrounded by an abundance of what have the appearance of hybernated specimens; a case in point, that will be fresh in our memories, is that of the autumn of 1887 and spring of 1888, when it was the common remark that after a season of unusual scarcity in the former year, the species not being seen at all in many places, it was suddenly, at the end of May in the latter year, swarming all over the country, and continued so through June and well into July. The second brood was not, however, by any means generally abundant, after a somewhat cold wet summer. Climatic conditions do not, however, appear to necessarily affect its appearance; and to quote an extreme case, we find that after the three successive cold wet years of 1815, 1816, and 1817, and the equally unpropitious spring of 1818, it was the commonest butterfly of the year; whereas, in the hot year of 1868 it was equally abundant. But perhaps the most important case of which we have definite record is that of 1879; not only was it of universal abundance in this country, but the greater part of Continental Europe was similarly or even to a greater extent affected. We are indebted to Mr. McLachlan for the compilation of much of the interesting information we have on the subject, (*E.M.M.* xvi. 49.)

In the autumn of 1878 the species was not unusually common here, and certainly did not occur in such numbers as to account for the enormous profusion in which it appeared in the following year. The first news we had of its abundance came from the east coast of Spain, where it was observed in countless numbers at the end of April; we have similar tidings from the island of Minorca at the commencement of May; and it was equally abundant in Italy from April to June. In the first half of this latter month, migratory swarms were observed passing through

many parts of France, Bavaria, Switzerland, Austria, etc. Thus we find that in Württemberg from the 1st to 8th there was incessant migration from south and west to north-east and east. At Zurich on the 7th an immense swarm moved from south-west to north-east, their flight being persistently in one direction. At Wettswil, on the same day, a swarm flew from west to east, and it is calculated that at least 11,000 passed the observer. In Upper Austria, on the 11th, surprising numbers passed from south-west to north-east ceaselessly; between 1 and 2 p.m., ninety to a hundred per minute were counted in a breadth of 100 paces. Near Geneva a swarm is said to have obscured the sun for several minutes. At Strasbourg, from the 3rd to 9th, great swarms appeared flying towards the north; while at Sèvres, near Paris, a similar occurrence was noted on the 15th, the direction taken being from S.S.E. to N.N.W., the wind at the time being S.S.W. At Angers, on the 10th, myriads passed from east to west, against the wind; and at Rennes, on the same day, vast numbers flew from south to north with great rapidity, sometimes twenty to thirty passed in a minute, and continued for some time at the same rate. Migratory swarms were not noted in North Germany or Belgium, but the insect was excessively common in the latter country. Returning to this country, we find that this species was not particularly common during the previous autumn or early spring months of this year; it was somewhat more plentiful in May; but it was not until June 10th that it was observed in great abundance. On that date it appeared in the "utmost profusion" (*E.M.M.* xvi. 99). This date is of importance, as it is unlikely that hybernating specimens would have remained quiescent until so late in the year, and it is equally improbable that spring broods would so soon have reached maturity; whereas, it fits in well with the time at which some of the migratory columns were passing over the continent in the direction of these islands; they, however, appear to have broken up on or before reaching our shores. Following on this abundance of the imago, larvæ were very abundant, being found in considerable numbers right into the end of October; but they do not appear to have arrived at maturity, and the species in the following year was even scarcer than usual. It may be worthy of mention, as illustrating its powers of flight, that a butterfly of this species was seen sunning itself on the bare rocks in the Great Desert of Nefud, Central Arabia, at least 400 miles from any place where the larva could have fed up (*E.M.M.* xvi. 185).

Most of the larger Sphingidæ are very irregular in their appearance; *Acerontia atropos*, L., for instance, although occurring here almost every year, is only occasionally really common, and then generally in the larval rather than in the perfect stage; while *Sphinx convolvuli*, L., although seldom found as larvæ, is from time to time quite common as imagines, and on such occasions its range generally extends over the greater part of these islands; it has been taken as far north as Aberdeen; and at Scilly in abundance. But perhaps there is no species more intermittent in its appearance than *Deilephila galii*, Schiff.; thus we find that in 1855 larvæ were fairly common in suitable situations on the south coast, and were also found some distance inland, some few being found even as far north as Perthshire. In 1856, 7, and 8, small numbers were found, and in 1859 it was quite common again; but in the two following years it was not to be found, although we know that it was diligently sought in favourite localities, and with the exception of three larvæ at Deal in 1862, a solitary imago in 1863, one larva at Folkestone in 1864, and another moth at Deal in 1868, we hear nothing of it until 1870, when imagines were taken far and wide during August, and the larvæ by hundreds in September and October. In 1871, after an exceptionally mild winter, a few larvæ were found on the south coast; and then for the next sixteen years they are conspicuous by their absence, indeed the only records we have of the species at all throughout the whole of this period are of single imagines taken near Norwich in 1875 and 6 respectively; but in 1888 we were again inundated with records of the imago from England, Scotland, and Ireland, and larvæ were subsequently found in hundreds. 1889, however, brought but two records of imagines, namely two taken in Cheshire, and one in Yorkshire, and a couple of larvæ at Dover and Wallasey respectively.¹ The abundance of 1888 will be so fresh in your minds that it is quite unnecessary that I should here recapitulate the history of the captures and subsequent finding of the larvæ; but there are two or three points in regard to it that I should like to say a word upon in passing. In the first place, we have no evidence that would lead us to suppose that the insect could remain quiescent in any of its stages for so long a time as would be necessary to connect the abundance of 1888 with that of 1870, nor can we suppose that it has occurred in such numbers during that time as would be necessary to perpetuate the

¹ I find no record of the occurrence of this species in either stage in 1890 or 1891.—R.A.

species, and been altogether overlooked. It must be remembered that we are not dealing with an obscure species of insignificant size, but with one of our largest moths, whose habits are well known, and that its food-plant is the same as that of several other species that are constantly in request; even, therefore, had this larvæ not been specially sought, it is probable that it would have been found had it existed; but we know that it has been sought frequently and without avail. A good deal has been said too about the relative size of the specimens captured, and those bred, in this country, and those of known Continental origin. I have here a table of measurements of the extremes of nearly 500 specimens, the measurements are given in millimetres.

| Four Largest and Four Smallest of upwards of 400 from S. Austria. | Two Largest and Two Smallest of 40 from Europe. | Five Europe. | Mr. Tugwell's Measurements, 1888. | | Captured ? Japan. |
|--|--|-----------------|--------------------------------------|-------|----------------------|
| | | | Captured. | Bred. | |
| 88 | 88 | 84 | 86 | 80 | 69 |
| 88 | 76 | 70 | 82 | 78 | |
| 87 | 68 | 66 | 79 | 67 | |
| 81 | 59 | 64 | 79 | 60 | |
| 69 | | 49 | 76 | | |
| 64 | | | 76 | | |
| 64 | | | 76 | | |
| 64 | | | 76 | | |
| | | | 71 | | |
| | | | 66 | | |

On comparing these figures we find that in both the Austrian and other Continental lists we have measurements in excess of both the captured and bred British examples; but if we exclude the Austrian specimens, we are left with but one that is larger than the largest of the bred British insects. On the other hand, we find that several of the Continental are smaller than the British captured specimens; but as I believe only the largest of those reared in England are given, any comparison with them would be manifestly unfair, and it appears that the only information that we can draw from these figures is that the insects captured in England more nearly approach those of known Continental origin than do those bred in this country; and although this taken by itself must be regarded as of small moment, it may be of some little importance when taken in conjunction with other evidence. The species has a wide Continental range, stopping short only of the most northern countries, but appears to be a much more common insect in the Mediterranean littoral than in the cooler districts further north.

But to return to its appearance in this country; it has been asserted that if the imagines taken were immigrants we should expect to find them, first on our Kentish coast, and then afterwards crossing the island by the midland counties, and lastly in our western districts and Ireland. Now, if the moths before starting on a journey sought the shortest sea route, as is said to be proverbial with our neighbours—the Frenchmen, I could well understand that Calais to Dover would suit them admirably, and that they would subsequently be found spreading across this country by the lines indicated. But unfortunately for this argument we have not one word in all the evidence regarding migration to indicate that such movements originate in the districts nearest to us, or that this short sea route is one followed by Lepidoptera observed in a migratory condition; but, on the contrary, we find that what few records we have tend rather to show that they originate in the more distant countries to the south of us (vide *Vanessa cardui*), and are of wide expanse. A glance at the map will show that any widespread northerly movement from those regions would embrace the whole of the British Islands, as well as North Germany, Denmark, Sweden, etc., where its fitful occurrence appears to be on a par with that observed here.

There is yet another moth that must claim our attention by reason of its fitful appearance. *Plusia gamma*, L., is one of our commonest if not our commonest species; it is present with us every year in greater or less numbers, and similarly occurs throughout the Continental region. In many respects its cases of abnormal abundance closely resemble those of *Vanessa cardui*; the two species appear to have the habit of suddenly coming upon us together, in multitudes, after an apparent season of scarcity. Only last year a case was mentioned at one of our meetings by Mr. Carrington, who told us that he had collected several times weekly over a certain part of Surrey, but had not up to 1st June met with a single example of either species. On that day one *V. cardui* was captured, and on the 3rd both it and *P. gamma* were seen in hundreds; and further, that both species gradually disappeared within a week, and were afterwards to be seen only occasionally. We do not, however, find that *gamma* was generally unusually common last year; nor had it been so in the previous autumn, although it had been observed in vast multitudes in many places, chiefly in the South of England in the preceding May and June.

In 1883 we also appear to have had an unexpected visi-

tation (*E.M.M.* xx. 69); we find that at Hartlepool it was first noted at the end of May, and was most abundant on to July, although it had not been seen there in the autumn of 1882, and had been comparatively scarce since 1879. Mr. Barrett also tells us (*E.M.M.* xx. 29) that at Pembroke it was abundant in June, where also it had been scarce during the preceding two years. It was also very abundant in Ireland (*E.M.M.* xxi. 134), extending even into the extreme west.

In 1879 the abundance was also of considerable range; but with one notable exception the records are all for the autumn, the one exception being Perthshire (*E.M.M.* xvi. 110), where the moths were swarming in the middle of June. They were also noted in countless multitudes at Ostend (*Entom.* xii. 222), in Switzerland (*Entom.* xii. 270), and other places on the Continent in August. From Devonshire (*E.M.M.* xvi. 196) we learn that very few were seen up to August 12th, when they suddenly appeared in myriads. The following day was wet, and few were to be seen; by the 15th it was again bright and sunny, but the moths had disappeared, the abundance lasting apparently but a few hours. It was also noted that here, as in some other places, the larvæ were less common than usual; but, on the other hand, in one locality in Sussex and in the Isle of Wight they had been somewhat abundant.

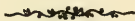
It was during the abundance of this year (1879) that Mr. South (*E.M.M.* xxi. 208) had the opportunity of observing a phenomenon, evidently regarding this species, that appears to be of some importance. He tells us that whilst walking over the downs in the neighbourhood of Ventnor, on a sultry evening in August, he observed a moth soaring upwards; and whilst watching it, he noticed others ascending. Looking around he saw many moths starting from the herbage; these also winged their way aloft, all towering upwards in a spiral flight, and were soon lost to view. A very similar occurrence also presented itself to my view some few years ago. As in his case, the night was warm and still; and as I was walking over what are known as the Free-Downs in the vicinity of Deal, it being quite light at the time, the sun having only just fallen below the horizon, I saw a moth rise from a field of standing corn, along which I was passing, and fly upwards; another and another followed, and being curious to know what species it could be that was performing so curious, and to me novel, feat, I managed with my hat, having no other ready means, to knock one down, and found it to be a *gamma*, and others similarly detained proved to be the same species. By this time they were rising from the corn in all directions,

literally in myriads, and all taking the same upward course until they were lost to view. At the time I placed but little importance on the curious sight that I had seen, but have many times thought of it since; and I am fully inclined to agree with Mr. South in what I take to be his view, that we had witnessed the initial movement of an extensive migration.

I have thus far dealt chiefly with the collecting together of the scattered fragments of evidence that bear upon the subject under our notice; and it remains for me, in concluding, to consider this evidence as a whole, and as such, to draw conclusions from it. In the first place, then, we have abundant evidence that migration does take place. In the case of *Pieris brassicæ* we have been able to trace the migratory swarms crossing the sea, landing on our coasts, and ultimately distributing themselves over the country. The sudden abundance of *Vanessa cardui* just at the time when such vast multitudes were observed immediately to the south of us, and moving in our direction, is also a significant fact, and the swarms of *Plusia gamma* and other species passing the Heligoland light "all going west," when taken in conjunction with the minor facts already detailed, point strongly to the conclusion that some cases of unusual abundance are due directly and solely to immigration. But it is equally certain that this theory will not hold good in all cases; the swarms of larvæ that from time to time devastate portions of our forests, must have been reared on the spot where we find them, as must also the quantities of *Deilephila galii* larva that have from time to time thrust themselves upon our notice, notably in 1888. This last outburst of this species, however, may perhaps give us a very good clue to the solution of the problem. It will be remembered that before any of the larvæ were seen, imagines corresponding in all respects with those known to inhabit the warmer countries of Continental Europe, were taken in various parts of this country, including Kent, Lancashire, Ireland, etc.; the numbers, however, were comparatively small, but they were succeeded by an "unusual abundance" of larvæ; that these larvæ resulted from the imagines of whose presence we became aware by some of them being taken, there can be no doubt; and there is some very strong circumstantial evidence that the imagines were migrants. It is, however, by no means certain that an arrival of moths would be always followed by an abundance of larvæ; but in this case, it will be remembered, they arrived at a time when, by reason of a hot summer, the conditions were favourable for their de-

velopment, and the abundance was thus due to a combination of favourable circumstances.

We therefore arrive at the conclusion, that the existence of favourable local conditions, at a time when extensive immigration takes place, may account for cases of sporadic abundance such as we have under consideration, and that a similar state of things may also result directly from immigration alone. On the other hand, we have no evidence that such cases of sporadic abundance are brought about by purely local causes; indeed, the inference is that such conditions, favourable to the abnormal increase of the one species, would also affect the many, and that the abundance would be general rather than restricted. Such cases are indeed of by no means uncommon occurrence in this country; but as they do not come within the scope of our present investigation, their consideration must be left for a future time.



List of Animals and Plants observed in the Leigh, Essex, district, between Southend Pier and Hadleigh Castle, July 25th, 26th, 27th, 1890.

By Mr. T. D. A. COCKERELL. Read August 14th, 1890.

AVES.

Perdix cinerea, Latr.

AMPHIBIA.

Bufo vulgaris, Laur.

Rana temporaria, L^s (Mr. J. T. Carrington.)

REPTILIA.

Tropidonotus natrix, L. = *Natrix natrix* (L.)

MOLLUSCA.

Limnæa peregra, Müll.

Helix cantiana, Mont.

Patula rotundata, Müll.

Hyalinia cellaria, Müll.

Helix virgata, DaC.

„ „ var. *subdeleta*, Ckll.

Helix caperata, Mont.

„ *aspersa*, Müll.

Scrobicularia piperata, Bellon.

Littorina litorea, L.

Cardium edule, L.

Mytilus edulis, L.

Tellina balthica, L.

Nassa reticulata, L.

Mya arenaria, L.

Limax agrestis, L.

Helix caperata var. *ornata*, Picard.

„ *hispida* var. *concinna*, Jeff.

Helix hispida, L.

„ *virgata* var. *albicans*, Grat. (Mr. J. T. Carrington.)

Planorbis nautilus, L.

Clausilia rugosa, Drap.

Helix pulchella, Müll.

„ *nemoralis* var. *lowea*, Moq.

„ *virgata*, band varieties (found by Mr. Carrington) :

○○3₄₅ ○○34₅₅5₅₅ ○○34445₅₅₅₅

○○3_{(44) 5555} ○○3₍₄₄₎5₅₅₅ ○○3₄₄₄₅₅₅

○○34₍₄₄₎55 ○○3₍₄₄₎45₅₅₅

Crustacea.

Armadillo vulgaris, Lat.

Carcinus mænas, Penn.

= *Armadillo armadillo* (L.)

Arachnida.

Epeira sp.

INSECTA.

Coleoptera.

Coccinella septempunctata, L. (on thistle).

Ocyfus brunnipes, Fb.

Hydrobius fuscipes, L.

Telephorus melanurus, Fb. (on thistle).

Notiophilus sp., probably *substriatus*, Waterh.

Anchomenus marginatus, L.

Trechus minutus, Fb.

Meligethes sp., probably *seniculus*, Erichs.

Helophorus griseus, Hbst.

Hymenoptera.

Rhodites rosæ, L. (galls).

Hemiteles fulvipes, Grav., bred by Mr. Billups, from a spider's (probably fam. *Epeiridæ*) nest found on a thistle by Mr. Adkin.

Neuroptera and Trichoptera.

Sympetrum striolatum, Charp.

Micronympha elegans, Vanderl.

„ *elegans* var. *rufescens* (Leach).

Limnophilus marmoratus, Curt.

Orthoptera.

Locusta viridissima, L. (Mr. Perks).

Lepidoptera.

Pieris brassicæ (Mr. South).

„ *rapæ*, L.

„ *napi*, L. (Mr. Carrington).

Vanessa urticae, L., at flowers of *Cnicus arvensis*.

Melanargia galatea, L.

Epinephele janira, L.

„ „ approaching *hispulla*, Hb.

„ „ ab. with one lower wing not fully expanded (Mr. Carrington).

„ *Tithonus*, L.

„ „ var. with pale patch on underside of underwing (Mr. Carrington).

Cænonympha pamphilus, L. (Mr. Carrington).

Pamphila lineola, Ochs. (common).

„ *thaumas*, Hufn.

Zygæna filipendulæ, L., and var. of cocoon half white and half yellow.

Hadena pisi, L., larva (Mr. Perks).

Phytometra viridaria, Clerck. (Mr. Hawes).

Acidalia inmutata, L. (Mr. Adkin).

Ematurga atomaria, L. (Mr. Carrington).

Coremia ferrugata, Clerck. (Mr. Carrington).

Camptogramma bilineata, L.

Eubolia limitata, Scop.

Crambus perlellus, Scop. (Mr. Carrington).

„ *culmellus*, L. „

Myelophila cribrum, Schiff.

Homæosoma binævella, Hb. (Mr. Adkin).

Catoptria, probably *cana*, Haw. (Mr. Adkin).

All these species are recorded in Mr. Vaughan's list in *Essex Naturalist*, 1889, pp. 125-140, except *P. lineola* and *E. atomaria*.

Hemiptera.

Philænus spumarius, L. var. (does not agree with any of the vars. given by Buckton) (on thistle).

Philænus lineatus, L.

Diptera.

Cecidomyia, probably *caprææ*, Winn., leaf-galls on willow.

„ possibly *peregrina*, Winn., leaf-galls on *Prunus spinosa*.

Empis livida.

Hæmatopota crassicornis, Whlbg.

Platycheirus.

Anthomyia, near to *perdita*.

Atomogaster, probably *pluvialis*, L.

Urophora stylata, Fab., a species already recorded by Schiner as breeding in thistles.

Chlorops sp. (on thistle).

Platypalpus fasciatus, Mg.

Annelida.

Lumbricus terrestris, L. (= *agricola*, Hoffm.)

Protozoa.

Noctiluca miliaris (Mr. Carrington).

Algæ.

Enteromorpha compressa, Grev.

Ulva latissima, Ag.

Fucus vesiculosus, L.

Fungi.

Æcidium tussilaginis, Pers. (on *Tussilago farfara*).

Trichobasis suaveolens (Pers.)

Agaricus (Psaliota) arvensis, Schaeff. (found by Mr. Carrington).

PHANEROGAMIA.

Monocotyledones.

Juncus glaucus, Ehrh. or aff.

Scirpus maritimus, L.

Carex vulpina, L.

Phleum pratense, L.

Alisma plantago, L.

Zostera marina, L.

Dactylis glomerata, L.

Lolium perenne, L.

Lemna minor, L.

„ *gibba*, leaves pink above
much swollen and bladdery-
inflated below.

Lemna trisulca, L.

Dicotyledones.

Statice limonum, L.

Aster tripolium, L.

Lotus corniculatus, L., type.

„ „ var. with crimson-suffused flowers.

Cnicus arvensis, Hoffm.

Trifolium pratense, L.

Linum angustifolium, Huds.

Tussilago farfara, L.

Rubus rusticanus, Merc.

Trifolium hybridum, L.

Beta maritima, L.

Bellis perennis, L.

Linum catharticum, L.

Lathyrus nissolia, L.

Vicia cracca, L.

Dipsacus sylvestris, Huds.

Erythraea centaurium, Pers., type.

„ „ *forma albiflora*, flowers quite white (common)
Prunella vulgaris, Huds., type (flowers violet).

Ononis spinosa, L.

Eryngium maritimum, L.

Agrimonia eupatoria, L.

Ononis arvensis, L.

Achillea millefolium, L.

Medicago lupulina, L.

Trifolium repens, L.

Anagallis arvensis, L.

„ *officinalis*, Auctt.

Artemisia vulgaris, L.

Melilotus alba, Desr.

„ *officinalis*, Auctt.

Reseda luteola, L.

Malva sylvestris, L.

Feniculum vulgare, Sow.

Convolvulus arvensis, L.

Veronica chamædrys, L.

Senecio vulgaris, L.

Plantago major, L.

„ *maritima*, L.

Artemisia maritima, L.

Quercus pedunculata, Ehrh.

Centaurea nigra, L.

Lathyrus pratensis, L.

Rubus corylifolius, Sm.

Prunus spinosa, L.

Dianthus armeria, L.

- Senecio jacobæa*, L. *Polygonum aviculare*, L.
Plantago lanceolata, Reich. *Urtica dioica*, L.
Parietaria officinalis, L. (on Hadleigh Castle).
Geranium robertianum, L. *Medicago maculata*, Sibth. (*arabica*, All.).
Potentilla reptans, L. *Nepeta glechoma*, Benth.
Cnicus palustris, Willd., type. *Ranunculus bulbosus*, L., type
 „ „ *forma albiflorus*, flowers white (two plants near Hadleigh Castle).
Ranunculus bulbosus var., leaf strongly blotched with brown.
Prunella vulgaris, Huds., *forma rosea*, flowers rose colour.
Galium verum, L. *Hedera helix*, L.
Convolvulus segetum, L. *Stachys sylvatica*, L.
Epilobium hirsutum, L.
Plantago lanceolata, monstrosity, flower heads multiple (Mr. Carrington).
Prunella vulgaris var., flowers bluish-white, sepals green, edged with purple (Miss Reade).
Chrysanthemum leucanthemum, L.
Bartsia odontites (Mr. Carrington).
Rubus sp., with leaves like *rusticanus* and *corylifolius* as to colour, on same branch of same tree.
Epilobium parviflorum (probably).
Sambucus nigra, L.
Cratægus oxyacantha, L.
Rosa canina var. or subsp.
Ranunculus trichophyllus, Chaix.

Summary.

| | |
|-------------------------------------|--------------------------------------|
| Birds, 1. | Lepidoptera 23 and 2 vars. |
| Amphibians, 2. | Annelida, 1. |
| Reptiles, 1. | Fungi, 3. |
| Orthoptera, 1. | Coleoptera, 9. |
| Diptera, 10. | Hymenoptera, 1. |
| Algæ, 3. | Neuroptera (sens. lat.) 3 and 1 var. |
| Dicotyledons, 66 and 7 vars. | Hemiptera, 2. |
| Mollusca, 20 and 12 vars. | Protozoa, 1. |
| Crustacea, 2. | Monocotyledons, 10. |
| Arachnida, 1. | Dicotyledens, 69 vars. 5. |
| Total 229 species and 27 varieties. | |

APPENDIX.

Bibliography of Leigh District.

Anthropology.

- T. G. WAKELING. [Roman Remains: Southend, mentioned.] *Essex Nat.*, 1889, p. 280.

Mollusca.

- J. G. JEFFREYS. [*Tapes aureus*: Southend.] *Ann. and Mag. Nat. Hist.*, vol. iv., p. 191.

Lepidoptera.

- H. VAUGHAN. [List of Lepidoptera of Leigh district, 508 species] *Essex Nat.*, vol. iii., 1889, pp. 123-140.
- J. T. C. [ARRINGTON.] [16 Lepidoptera: 4 not in Vaughan's list, viz., *A. iris*, *L. sibylla*, *M. athalia*, and *D. euphorbiae*, were said to occur formerly: *H. lineola* recorded, also new to list.] South London Entom. and N. H. Soc. (circular of) 3rd Field Excursion, 1890. [published July 26th, 1890.]
- R. S. [OUTH.] [*Hesperia lineola* at Leigh.] *Entom.*, 1890, p. 264.
- J. W. DOUGLAS. [*P. daphnidice*: Southend.] *Ent. Mo. Mag.* xiii., p. 108.
- COLEMAN. [*Papilio machaon*: Southend.] *British Butterflies*.
[*A. lathonia*: Southend.] *Entom.*, iv., 160.

Botany.

- H. VAUGHAN. [A few species mentioned.] *Essex Nat.*, 1889, pp. 124, *et. seq.*
- ANON. [Several species mentioned.] *Essex Nat.*, 1889, p. 282.
- ANON. [*Epilobium hirsutum*, white var.: *Equisetum maximum*.] *Essex Nat.*, 1889, p. 285.

REPORT, 1891.

NOTWITHSTANDING the good work done by the Society during the year, as shown by the increased attendance at the meetings and the number of papers read, the Council have to announce a slight falling off in membership. When the Report for 1890 was read there was a total of 232 members; during the year 16 new members have been elected, as against 32 the preceding year; 2 members have died, viz., Mr. P. F. J. Lowrey of Brixton, and Mr. G. P. Shearwood of Norwood; 10 members have resigned, and the names of 7 others have had to be removed by the Council, leaving a present membership of 229, consisting of 6 honorary, 5 life, 54 country and 164 ordinary members.

It was not expected that the Society would continue making new members at the rate of fifty each year, as was done in 1886, 1887 and 1888; but the number elected this year compared favourably with that of last year.

Twenty-five meetings were held, with an increased average attendance; and despite the bad season, the exhibits have been fully up to the average.

The financial position of the Society was in every way satisfactory, but the balance will be considerably reduced by the cost of printing the Abstract of Proceedings for 1890 and 1891.

Mr. RICE still continues in charge of the Library, and the Proceedings issued in the early part of the year, contained a complete catalogue prepared by Mr. Rice of the books, etc., in the Library up to the end of 1890.

The additions since that date are as under:—

“The Entomologist’s Monthly Magazine” for 1891, from Mr. MCLACHLAN.

“The Entomologist” for 1891, from Mr. LEECH.

“The Zoologist” for 1891, from Mr. NEWMAN.

"The British Naturalist" for 1891, from Mr. ROBSON.

"The Essex Naturalist" for 1891, from the ESSEX FIELD CLUB.

"The Record" for 1891, "British Noctuaë and their Varieties" (Tutt), "Melanism and Melanochroism" (Tutt), from Mr. TUTT.

"Annual Report of Fruit Growers' Association and Entomological Society of Canada," from Mr. LACHLAN GIBB.

Part I. of "Journal of Institute of Jamaica," from Mr. T. D. A. COCKERELL.

A bound copy of all the Society's Proceedings from Mr. T. R. BILLUPS.

"Dulwich College Scientific Society's Report" for 1890, from the SOCIETY.

The Collections continue under Mr. W. WEST'S charge; and since Mr. Alexr. Gibb's handsome donation of the Cabinet referred to in last year's Report, Mr. West has done much towards the re-arrangement of the collections, and he reports as follows:—

"It is my intention to have forty drawers for the Lepidoptera, and I have already managed to complete thirty-one, which brings me to the end of the Tortrices; the Tineæ, I have no doubt, will take the remaining nine, and I hope to complete them very shortly. Eight drawers are taken up by Mr. Gibb's American collection; the remainder, twelve in number, are in very bad condition, and not fit for insects; but I have no doubt I shall be able to make use of them later on. The smaller cabinet will be very useful for the other orders, and I hope to have, if my health permit, the collection complete before the end of the present year, 1892. I have two lists marked which I have sent to several of our members, and have received assistance from them."

With reference to the Society's collections, it will be noticed that there are many species either entirely wanting, or the series is incomplete; those members who have duplicates might do much to improve the reference value of the collections.

The Council wish to record their thanks both to Mr. WEST and to Mr. RICE for the good work which has been done by them in placing the Collections and Library on so satisfactory a basis.

Four excursions were held during the year, viz. :—

May—Oxshot, Surrey.

Conducted by Mr. R. South.

June—Eynesford, Kent.

Conducted by Mr. John T. Carrington.

July—Leigh, Essex.

Conducted by Mr. W. H. Tugwell.

In September, Ashted, Surrey, was chosen for the Fungus foray ; but owing to the stormy nature of the weather only Mr. Step, who had kindly offered to conduct the party, and Mr. Oldham attended.

The Council desire to thank Messrs. SOUTH, CARRINGTON, TUGWELL and STEP for conducting the various excursions.

It was intimated to the Council, when arranging the programme of excursions, that it would be advisable to abandon the tea, which for some years past had been arranged at the close of each excursion ; and in order to provide against possible loss in arranging with the railway companies for cheap tickets, it was decided to ask twenty members to sign an undertaking agreeing to take tickets for the first three excursions. The necessary signatures were obtained immediately the matter was put before the members.

In the beginning of the year the Proceedings for 1888–89 were issued to members. Those for 1890–91 are almost ready for printing, and can, should the new Council think fit, be issued within the year.

Owing to the difficulties that were constantly arising under the old rules of the Society, and the evident want of a set of rules or bye-laws which would ensure the smooth management of the Society, Mr. C. A. BRIGGS prepared a draft of a set of bye-laws, which were submitted to the Council. After careful consideration and with a few modifications they were submitted for the consideration of the members. With some

slight alterations they were, at a special meeting held on the 22nd October last, adopted as the Society's Bye-laws.

The Annual Exhibition was held on the 16th and 17th April, and was undoubtedly the most successful of the many exhibitions that have been given by the Society. The exhibits were more numerous and interesting, the attendance was larger than usual, and the number of tickets purchased was in excess of the two previous years. This, however, owing to the increased expense of hiring the rooms, etc., was not sufficient to defray all expenses, but the deficit was met by the Council and some few friends. The Society's contribution, as will be seen by reference to the Balance Sheet, was comparatively small.

The Annual Dinner was held on the 12th January at the Bridge House Hotel; and those members who were present need not be reminded of the pleasant evening that was spent; the thanks of members being especially due to those who so ably assisted the Dinner Committee in carrying out the necessary musical arrangements.

In conclusion, the Council wish to impress on members that although the falling off in membership is so small, it will not be wise to disregard it. The Society ought not to be allowed to stand still nor go back; and it is earnestly hoped that members will recognise the full importance of this and exert themselves to bring in new and useful members, and by reading papers and making exhibits, render the meetings so attractive that we may not only sustain our present position, but go forward, both as regards membership and the scientific value of the meetings.

H. W. BARKER,

Hon. Sec.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

TREASURER'S ACCOUNT, 1891.

GENERAL FUND.

| <i>Receipts.</i> | <i>£ s. d.</i> | | <i>Expenditure.</i> | <i>£ s. d.</i> | |
|----------------------------|----------------|------------------|--|----------------|------------------|
| To Balance, Jan. 1st, 1891 | ... | 31 2 10 | By Rent and Attendance | ... | 27 10 0 |
| " Subscriptions Received:— | | | Printing | ... | 9 15 6 |
| Life Subscription | 5 5 0 | | " Postage and Stationery | ... | 18 8 5 |
| Entrance Fee and New Sub. | 6 15 0 | | " Contribution towards Annual Exhibition | ... | 1 7 6 |
| Ordinary Subscriptions | 43 18 0 | | Sundries | ... | 1 11 9 |
| Arrears... | 7 10 0 | 63 8 0 | Balance | ... | 35 17 8 |
| | | <u>£94 10 10</u> | | | <u>£94 10 10</u> |

PUBLICATION FUND.

| <i>Receipts.</i> | <i>£ s. d.</i> | | <i>Expenditure.</i> | <i>£ s. d.</i> | |
|-------------------------------|----------------|----------------|---|----------------|----------------|
| To Balance, Jan. 1st, 1891... | ... | 37 2 6 | By Cost of Production, "Proceedings," 1888-89 | ... | 48 19 9 |
| " Donations | ... | 13 2 6 | Balance | ... | 2 1 9 |
| " Sale of "Proceedings" | ... | 0 16 6 | | | |
| | | <u>£51 1 6</u> | | | <u>£51 1 6</u> |

LIBRARY FUND.

| <i>Receipts.</i> | | <i>Expenditure.</i> | |
|---------------------|----------------|------------------------------------|----------------|
| | £ s. d. | | £ s. d. |
| To Balance ... | 3 12 5 | By Subscription to Ray Society ... | 1 1 0 |
| „ Library Fines ... | 1 0 4 | „ Balance ... | 3 11 9 |
| | <u>£4 12 9</u> | | <u>£4 12 9</u> |

| <i>Assets.</i> | | <i>Liabilities.</i> | |
|--|-----------------|--|-----------------|
| | £ s. d. | | £ s. d. |
| To Cash Balance, General Fund ... | 35 17 8 | By Rent, due Christmas, 1891 ... | 6 5 0 |
| „ „ Publication Fund ... | 2 1 9 | „ Balance of Assets over Liabilities ... | 48 6 2 |
| „ „ Library Fund ... | 3 11 9 | | |
| „ „ Estimated Realisable Proportion of Arrears | 13 0 0 | | |
| | <u>£54 11 2</u> | | <u>£54 11 2</u> |

Audited, compared with Vouchers, and found correct, *January 21st*, 1892.

C. FENN,
THOS. W. HALL, } *Auditors.*

PRESIDENTIAL ADDRESS 1891.

GENTLEMEN,

Following the custom of our Society, it is now my privilege to give a short valedictory address. With the time at my disposal, it of necessity must be very brief, and that possibly will be its only merit.

After the clear financial statement given by our painstaking and able Treasurer, Mr. E. Step, and the Council's report, at the hands of our invaluable Secretary, Mr. H. W. Barker, we have virtually an epitome of the year's transactions. That being so, I feel you will hardly desire me to weary you by enlarging on these topics; suffice to say that although we have not increased our numbers so much as in some previous years, still we have much cause to congratulate ourselves on our sound financial condition and generally healthy progress, whilst our field of usefulness enlarges year by year.

Our Scientific Library supplies a want which general libraries do not meet, you may find in them plenty of works on Travels, History, Philosophy, Fiction, etc.; but good editions on Biological Science are rarely, or never, to be obtained there. This being so, we should study and strive to improve and enrich our shelves with the best editions of the leading standard works on all branches of Natural History, and these well up to date. It is not so much the number of volumes you may possess, it is rather that those you may have should be the very best of their kind. Books of this class are necessarily expensive, so much so, that very few of us can afford to place them on our own book-shelves. Works of smaller value we may purchase, so it is just these standard and somewhat costly works that make a scientific library invaluable, and also are a strong incentive for members to join our ranks. Of course, to be able to purchase expensive books, requires a goodly fund; unfortunately for us, with our small subscriptions and fairly heavy expenses, we have not

a large balance available. But it has occurred to me, that only a short time since several of our members were desirous of increasing the subscription to half a guinea, or even one guinea. Now, if these gentlemen would carry their idea into practice personally, they would be doing the Society a great service, as they might pay the larger sum annually with the promise that the amount above the usual sum should be passed to the Library Fund, and by this means we should be enabled to purchase many more and better books.

This idea is not original, it is carried out in the Yorkshire Naturalist Union, a Society which has possibly a larger membership than any other of its kind in the United Kingdom. The last published list of its members reached the grand total of just on three thousand. In the Yorkshire Naturalist Union they accept a minimum subscription of five shillings; but its members may subscribe any sum above they may please. It is needless to say, that very many do subscribe their guinea, and by this means they have funds to publish some most extensive and valuable books on the Fauna and Botany of the whole of Yorkshire. It is a pity we cannot do something on these lines.

A few years since it was quite a common question to be asked by those who knew nothing of Natural History (and then they were an extremely numerous class), What was the use of such societies as ours? Was it not a mere waste of time to go butterfly hunting or beetle catching? and Naturalists generally were looked down on almost as harmless lunatics. Fortunately, with the spread of education and entomological literature, this idea is fast dying out. People are beginning to recognise the fact that Naturalists can, and often do, render them a considerable service, by giving them instructions how to combat the swarms of noxious insects that too often devastate their farms, gardens, orchards, granaries, etc., inflicting on them serious losses. It has doubtless occurred to many of our members here to-night to have been solicited by those suffering from a plague of destructive insects, for information as to what they could do to arrest or rid themselves of these pests? This has frequently

happened to myself; only the past year, a maltster came to me in great tribulation, as in a very large malthouse of several stories, or floors, of malt and grain, they were overrun with granary weevils. I went with him to inspect, and if possible, to advise. There, sure enough, these devastating creatures were in swarms outside the building, which was almost a new construction, in the passages, offices, in fact everywhere, they were much too numerous; but the chief spot was in the malt store. Here they were in thousands. I gave general instructions what plan to follow, and these were carefully carried out, and as a result, they are now well in hand, their number being considerably lessened; in fact, not sufficiently numerous to be of serious importance.

The losses occasioned by insect ravages, is in some countries so enormous, that their governments have seen the necessity of taking special measures to try and arrest them. Thus, America, Canada, Australia, and several Continental powers, have added to their Department of Agriculture an Entomological Section. In America, this body carries out thoroughly a system of practical and applied entomology, to lessen the vast amount of destruction to crops caused by insect pests. Professor C. V. Riley is chief of this section, aided by nine staff officers and ten field agents. A magazine is published by this body under the name of *Insect Life*, and a most interesting work it is. It is written in a fairly popular manner, often in the form of question and answer. The use of scientific phraseology is avoided as much as possible in order to enlist the attention and sympathies of the farmers and fruit-growers, whose interest this work has been instituted to protect. The great use of vulgar names of insects rather strikes an English reader; thus you find articles under Army-worm, Boll-worm, Cut-worm, Screw-worm, Tent-worm, and so on. Still, it is a very instructive volume indeed.

Curiously, many of the insect pests of America, which evidently commit a vast amount of damage there, are also English species; but with us, they rarely, or never, attain injurious proportions. Thus the gipsy moth, *Ocneria dispar*, L., a species not truly native in America, as it was

accidentally introduced there some twenty years since by a Mons. Trouvelot, when some larvæ he was feeding escaped from his cages. These have since increased to such proportions, that they have become a most serious pest. Last year they devastated a very large area; nearly 500 square miles of territory were much injured by them. The amount of damage caused by these larvæ may be gathered from the fact that in 1891, in Massachusetts alone, so alarming was the mischief worked there on fruit and other trees, that a Government Commission was called to try and arrest the evil. They voted the sum of 100,000 dollars for the work; but even this considerable sum of money was found quite insufficient for the task in hand. They had a force of 117 men, working thirty spraying teams, each carrying a powerful pump and two running lines of hose, mounted with a cyclone nozzle, for diffusing in fine spray a mixture of "Paris green" in water, to poison the caterpillars. But with all this expenditure and force they could only check their ravages, not able to eradicate them.

Here we see a curious fact, in England this same insect has apparently died out, as it certainly no longer exists with us in a wild state, formerly it was tolerably common in the Whittlesea district and elsewhere. This is a curious problem, why it should die out with us, yet in America increase so rapidly. Another of our English moths, which with us rarely, or never, does any serious mischief, *Clisiocampa neustria=americana*, in America commits great injury to fruit-growers, almost vies with *O. dispar* in its depredations. This species they call the "Tent-worm," or caterpillar, so named from its tent-like nests. Spraying with "Paris green" and "London purple" (two arsenical compounds), is much used in America to destroy this larva. It is on authentic record, that a closely allied species, *Clisiocampa distria*, Hulb., occurred in such countless thousands in the larva state, that for three days in succession trains were brought to a standstill, the driving wheels slipped round as though they were oiled. The rails and cross-ties were said to be obscured from sight, and the ground and swamps on each side of the track were covered with millions

of crushed caterpillars, and from this mass an unendurable stench arose. This statement is vouched to be substantially true by one of the Government Entomological Assistants sent to verify the case.¹ Fortunately for us, we seldom, or perhaps never, in this country get such devastating swarms of insect life. We get mischief enough from the turnip-fly and the hop-fly, whilst *Cheimatobia brumata* often destroys a large quantity of our fruit crops. Our gooseberries too get defoliated by the ravenous jaws of *Nematus ribesii*, and in consequence, they severely injure, some years, our supply of that useful fruit; yet, on the whole, we in England possibly suffer less from insect ravages than most countries, and for which we have much to be thankful for. I once saw a large wooded tract of country in the Tilgate district, defoliated by larvæ of several species of lepidoptera; the large oaks were eaten bare of leaf, only the midribs of the leaves remaining. It was indeed a curious sight in midsummer, to see the trees almost as bare as midwinter, as you stood quietly under the trees, the constant falling of frass on the dry herbage beneath was like the pattering of rain-drops. Such sights with us are happily extremely rare.

I feel, Gentlemen, that I shall be trying your patience, so will only mention one more of our species, that never with us figures as an injurious insect, viz., *Psilura monacha*. But on the Continent the "Nun," so called, is a most destructive creature. In Germany, Austria, Bohemia, etc., its ravages are enormous. In 1891, in Bohemia alone, this species is credited with destroying 20,000 acres of spruce-fir; and in Germany many thousand square miles of forest-land were seriously injured by the same moth. So, Gentlemen, you see the *raison d'être* of establishing Government Entomological officials, to find out, when possible, the best means of arresting these pests.

The entomological season of 1891 has been of a most peculiar character; following an exceptionally severe winter, we had

¹ See *Insect Life*, vol. iii., pp. 477-8, where it is also stated that the trains are stopped almost yearly from the same causes, and that the insects most involved are the "Army-worm," our *Heliothis armigera*, the Tent-caterpillar, and various migratory locusts.

an opportunity of judging if extreme cold would have had any marked effect on insect life; to my mind it tends to protect rather than destroy, no amount of continuous frost kills them. A broken season, on the contrary, with mild intervals, followed by wet and cold nights, doubtless is far more destructive. The experience of the past year tends to prove this fact. Lepidoptera were generally fully up to their normal numbers, many species unusually abundant; and our brothers of the net, all over the United Kingdom, reported favourably of the season until the miserably wet and cold July and August. Even during this time, in some localities, notably in the Fen district, our collectors were having a grand time of it. A great cause of failure was the non-attractiveness of sugar. It is a peculiar feature that at some period of a season this bait utterly fails to attract, it is not that moths are not plentiful; you may see them dash by in headlong flight, but they heed not the sweet feast spread for them. I am disposed to think that we rely too much on our sugar patches; should these fail, many return from their outing empty-handed, when, if they had searched carefully on the herbage, grass and flowers with a light, a good haul might have awaited them. My rarest and best captures have resulted from search, rather than sugar. That imagines were generally plentiful is, I think, proved by the fact that in the autumn we were invaded by an extraordinary number of larvæ; they were in evidence everywhere, not only common species, but also many usually considered rarities as well.

The only novelty to our lists of Macro-lepidoptera was a single specimen of *Prodenia littoralis*, which was bred by Mr. Boden from a larva found feeding on tomato. Naturally this has no pretension to being British; but it is interesting as indicating a possible addition to our list now that this fruit is so largely imported to this country. Just as many additions to our fauna have arisen by imported seeds, fruit, etc.

A supposed new Tortrix was announced from Ireland by Mr. Carpenter, as *Tortrix donelana*; but this is generally believed to be, by our best authorities, merely a local form of *T. viburnana*.

In the Tineina we have six new species added to our list.

Coleophora leucapennella, Hub., a single specimen of this novelty was captured by the Rev. C. T. Cruttwell in Norfolk ; determined by Mr. C. G. Barrett (*E.M.M.*, vol. xxvii. p. 302).

Conchylis (Eupæcilia) erigerana, Wlsm. This is rather a correction of nomenclature than a new species. The insect has been for years in our collections as *E. anthemidana*, and is very common in Kent, feeding in flowerheads of *Erigeron acre*. To Lord Walsingham is due this addition (*E.M.M.*, vol. xxvii. pp. 1-4).

Gelechia (Anacampsis) sparsiciliella, Barr. Some specimens of this insect were captured by Mr. C. G. Barrett at Pembroke, and remained unnamed till now (*E.M.M.*, vol. xxvii. pp. 7-8).

Symmoca signatella, H.-S. This novelty is an introduced species, probably on Spanish cork, and hardly naturalized yet. This was added to our fauna on the authority of A. F. Griffith, M.A., who captured some six specimens near the London Docks.

Micropteryx caledoniella, Griff. Twelve specimens of this new species were captured by A. F. Griffith, M.A., in Sutherland (*E.M.M.*, vol. xxvii. p. 300).

Micropteryx sangiella, Wood. We are indebted to Dr. Wood for this addition, who has bred it from birch, and differentiated the species (*E.M.M.*, vol. xxvii. pp. 100-1).

Tinea subtilella, Fuchs. This little stranger has been found by N. M. Richardson, B.A., at Portland (*E.M.M.*, vol. xxvii. pp. 14-15).

This completes the list of novelties for 1891 in Lepidoptera. It is hardly to be expected in a country as closely worked as is the United Kingdom to add many new species, still it proves we have not yet exhausted Nature's store of gems.

In other, and possibly less-worked orders, students have a greater opportunity to discover new species, and so they add, naturally, a larger number in proportion. Coleopterists, however, only give us five additions.

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|---|-------------------------------------|
| <i>Anaspis septentrionalis</i> , Champion | (<i>E.M.M.</i> , vol. xxvii. 105). |
| <i>Heterocerus britannicus</i> , Kuwert | (" " " 132). |
| " <i>pulchellus</i> , Kies. | (" " " 207). |
| " <i>salinus</i> var. <i>rectus</i> , Wat. | (" " " 206). |
| <i>Pityophthorus lichtensteinii</i> , Ratz. | (" " " 16). |

Our Dipterists head the list by giving us twenty-nine new species, whilst our workers amongst the Hemiptera follow with ten additions, and our Hymenopterists with twelve.

If our Macro group of Lepidoptera has no novelty, yet the past year was fairly rich in good and rare species. *Vanessa antiopa* was only once recorded—from Balham. There is a great peculiarity attached to this species in England. Hardly a year passes without it being captured, and in some favoured seasons it has occurred in considerable numbers, notably in 1872, when several hundreds were reported in our magazines. Yet it is almost beyond dispute that it has never been found here in the larval stage. If it did occur, it could hardly have escaped detection. Having no personal knowledge of this larva I wrote for information of my friend Mr. Lachlan Gibb, who is now residing in Montreal, where the species is fairly common; and he sends me the following reply from the pen of Mr. H. H. Layman, a Canadian Entomologist of high repute—"The larva of *antiopa* does not, strictly speaking, make a nest, as the leaves of the trees are not enclosed; it only spins a web over the branches and twigs on several species of willow, on the American elm, and on some of the poplars. As the caterpillars are gregarious in their habits, their ravages are very soon seen; and as they are quite formidable-looking creatures, being black, with red spots with branching spines, they are readily detected." Thus, I think, it must be admitted, that from some peculiar and unknown reason *antiopa* never breeds here; why not, is an interesting problem to solve.

Several good clear-wings have been captured, as *Sesia sphegiformis* at Tilgate, *S. formiciformis* in Surrey, and *S. scoliceformis* has been sparingly bred from Rannoch. *Zygæna exulans* was found in its only Scotch locality, Braemar, by the

favoured few who get to its haunts, and *Stauropus fagi* has been found in unusual numbers. But it is possibly amongst the Noctuids that the greatest rarities have occurred. *Nongria concolor* is reported by Mr. Mera, one of our members. This is the rarest of this genus. *N. cannæ* has been captured and bred from pupæ found in stems of *Typha latifolia* and *T. angustifolia*, in the Norfolk Broads, in some numbers. A few *Leucania albipuncta* have occurred on the Kentish coast. Mr. Tutt was fortunate enough to box two fine examples of the rare *Hadena satura*, at Wicken, whilst several species of good *Agrotæ* have been more common than for many years past. *Plusia moneta* has been reported from Guildford, Surrey, by Mr. H. C. Lang. Many good Geometræ have rewarded our collectors. *Cidaria reticulata* is still a little mine of wealth to those who reside in its locality; and Mr. Gardner, of Hartlepool, has been fortunate enough to find *Botys lupulinalis*. Let us hope he may follow it up and breed it, as it is one of our rarest species, few of us possessing even a type. *Crambus myellus* has occurred again in Perthshire and Aberdeenshire; whilst *Retinea duplana* has been unearthed in the North of Scotland,—not the small dark form of *R. turionana* that has at times done duty for the true *duplana* in our collections.

This is but a cursory glance at the year's doings; but I feel that my time and your patience are exhausted. I can only add, that a proof of the marked increase in the number of votaries to scientific Natural History, is to be seen in the large amount of Biological Literature that now finds a ready sale. An exhaustive work on Coleoptera, by Canon Fowler, M.A., F.L.S. The Hemiptera-Heteroptera, by Edward Saunders, F.L.S., which has just commenced, and gives excellent promise of being a most valuable treatise. The Lepidoptera of the British Islands, by C. G. Barrett, F.E.S., has every guarantee of being the best work we have ever had on this subject. Many of us, the older lepidopterists, could only wish that Mr. Barrett was to begin at the Pyralidæ and Tortrices instead of the Diurni.

It now only remains for me to thank you most heartily

for the honour paid me twelve months since in electing me President of this Society, and for the considerate kindness I have ever received at your hands. The old French adage holds good : "Qui s'excuse, s'accuse ;" so I will not apologize for any short-coming on my part. I have ever, to the best of my ability, tried to work for the truest interest of the Society. In conclusion, I sincerely congratulate you on the excellent choice you have made in electing Mr. C. G. Barrett as my successor. In his hands I have every confidence that the year we commence this night will prove a most successful one.

W. H. TUGWELL.

ABSTRACT OF PROCEEDINGS.

JANUARY 8th, 1891.

W. H. TUGWELL, Esq., Ph.C., *Vice-President*, in the Chair.

Messrs. H. Williams and T. J. Washford were elected members.

Mr. Tugwell exhibited series of *Miana strigilis*, Clerck., and *M. fasciuncula*, Haw., and referred to the statement recently made by Mr. Tutt, that although these had hitherto been considered as distinct, he was of opinion that they were only forms of one species, he having received from the Rev. W. F. Johnson specimens taken at Armagh, which in Mr. Tutt's opinion were intermediate between *strigilis* and *fasciuncula*. Mr. Tugwell said this statement had considerably surprised him, and he at some length pointed out what he considered to be distinctions between the two, not only superficial but also structural; he also referred to the descriptions of the larvæ respectively published by Newman and Buckler; and in conclusion stated that he was clearly of opinion that they were distinct, the more so as Mr. Tutt had based his conclusion entirely on the appearance of these intermediate forms, and not on his knowledge of the life-history of the two species.

Mr. C. Fenn remarked that he did not think that much importance should be attached to the published descriptions of the larvæ, as in their different stages larvæ varied to such an extent that descriptions of solitary examples were of little or no value, and further, in his opinion, Mr. Newman's descriptions of larvæ were not very reliable, as he never adopted any system in describing them.

Mr. R. South expressed an opinion that the two species were undoubtedly distinct, and referred to the hairy tufts on the abdomen of *strigilis* as a very good character; he did not think it was possible to confuse the two.

Mr. C. G. Barrett also agreed that the two were distinct, pointing out what he considered good distinctive characters between them, the different proportions of the thorax and abdomen, and different shapes of the forewings, adding that the larvæ, which were internal feeders, were very difficult to obtain and rear, and would no doubt vary considerably.

Mr. Tutt said he considered the points of difference alluded to were only superficial, and altogether unsatisfactory. The remarks made by him as to *strigilis* and *fasciuncula* being identical, were based not on an isolated specimen of the form received from Ireland, but on a long series of the form which was certainly intermediate between the two. With reference to the descriptions of the larvæ which had been published from time to time, he attached no importance to these, as no two of them agreed.

Mr. Tutt, on behalf of Mr. Reid of Pitcaple, exhibited a long, varied series of *Agrotis simulans*, Hufn.; a series of *Triphæna comes*, Hb., varying from pale to almost black specimens, including some beautifully banded forms; very bright forms of *Melitæa aurinia*, Rott.; also dark examples of *Melanippe fluctuata*, L.; and some six or eight specimens of *Abraxas grossulariata*, L. Mr. Tutt stated that this last species was rare in Aberdeenshire, and had been introduced by Mr. Reid at Pitcaple with some success, and had apparently developed sexual dimorphism, the males becoming darker and the females paler every year.

Mr. R. Adkin exhibited a long series of *Boarmia repandata*, L., bred from ova of a moth taken at Westerham. During hybernation the larvæ were divided into two equal lots, the one kept on growing privet, the other on growing birch. Although each lot produced some few individuals varying from the majority, there was no marked difference between the bulk of the one lot and the other.

Mr. R. Adkin also exhibited *Boarmia gemmaria*, Brahm, bred from ova from a moth taken in his garden at Lewisham. The larvæ were similarly treated, the one lot having jasmine, and the other birch, during the winter, and there was no appreciable difference between the moths, all being of the ordinary form. With regard to the larvæ, he remarked that in both species a considerable variation existed both before and after hybernation, some individuals being putty-coloured, others of dark shades of brown, while these two extremes were connected by intermediates. He was unable to trace this great variation to environment, as both the light and dark forms had been subjected to the same surroundings.

Mr. Adkin also exhibited *Retinia buoliana*, Schiff., and *R. pinicolana*, Dbl., bred from larvæ collected in the neighbourhood of Poole, the New Forest, and in Surrey. Those from Poole and the New Forest emerged between June 26 and July 27, and were all *buoliana*. Those from Surrey emerged between July 12 and August 3. From July 12 to 22 all were

buoliana ; from July 25 to August 3 all *pinicolana*, with the exception of one *buoliana* bred on July 27.

With regard to the position in the twig on which they respectively fed, there was very little doubt that *buoliana* fed in the soft wood of the young shoots, whereas *pinicolana* was seldom if ever found in any except the leading shoots.

Mr. W. Manger exhibited a box of Coleoptera from Australia.

JANUARY 22nd, 1891.

ANNUAL GENERAL MEETING.

W. H. TUGWELL, Esq., Ph.C., *Vice-President*, in the Chair.

Mr. J. C. Dacie was elected a member.

Mr. Billups exhibited *Sericomyia borealis*, Flin., and the rarer species *S. lappona*, L., *Chilosa æstracea*, L., *Arctophila mussitans*, F., *Eristalis intricarius*, L., and *Volucella bombylans*, L., with very dark varieties of the same species, all taken in Aberdeenshire last season.

Mr. A. J. Short exhibited two pale forms of *Polyommatus phleas*, L., approaching var. *schmidtii*, Gerh.

Mr. J. A. Clark exhibited a variety of *Arctia caia*, L., the white markings in the superior wings being replaced by brown.

Mr. South exhibited three specimens of a *Miana*, which he said he considered to be new ; they, with others, were taken with a long series of *Miana strigilis*, Clerck, in North Devon, and at the time he considered them to be merely forms of that species. Owing to the suggestion that *strigilis* and *fasciuncula*, Haw., were forms of one species, he had been led to examine his series of these two insects more closely, with the result that he was quite satisfied that *strigilis* was distinct from *fasciuncula*. With regard, however, to the three specimens now exhibited, after a careful and minute examination, he found the specimens were neither referable to *strigilis* or *fasciuncula*, nor could they be considered as intermediate forms, and he was inclined to think they were a distinct species which had hitherto been overlooked.

Mr. Tugwell thought that an examination of a larger number of specimens would be necessary before coming to a conclusion as to whether the specimens in question could be considered as belonging to a new species, or as only divergent forms of *M. strigilis*.

Mr. Tutt exhibited the specimens of *Miana* which he had received from Armagh, and which he considered intermediate between *strigilis* and *fasciuncula*, and stated that in his collection he had a series of the two, comprising some 250 speci-

mens. He and Mr. Atmore had during the afternoon been through the whole, and could not find a single typical point of difference, either in the stigmata or the transverse lines; and with regard to what had been said as to the dorsal tufts, they found them quite as commonly in *strigilis* as in *fasciuncula*.

Mr. Adkin inquired if the two species occurred together. In his experience he usually found that *fasciuncula* was an earlier species than *strigilis*.

Mr. Fenn said that *fasciuncula* was very nearly over when *strigilis* began to come out; and in addition the first-named only occurred in meadows and marshes, whereas *strigilis* was found quite as abundantly in woods.

Mr. Tugwell and Mr. Tutt both reported that *fasciuncula* occurred on Deal sandhills in company with *strigilis* up to the middle of July.

Mr. Hall said that both species occurred together at Catford.

Mr. South said he did not think much importance attached to the time of appearance; he thought the characteristic distinctions between the two were so marked that there could be no possible doubt as to there being two distinct species.

The remainder of the evening was devoted to receiving the reports of the Council and Officers, and to the election of Officers for 1891, as follows:—

President.—Mr. W. H. Tugwell, Ph.C.

Vice-President.—Mr. J. Jenner Weir, F.L.S., F.Z.S., F.E.S.

Hon. Treasurer.—Mr. E. Step.

Hon. Curator.—Mr. W. West.

Hon. Librarian.—Mr. D. J. Rice.

Hon. Secretaries.—Mr. H. W. Barker, F.E.S., and Mr. D. J. Rice.

Council.—Messrs. R. Adkin, F.E.S., T. R. Billups, F.E.S., C. A. Briggs, F.E.S., J. T. Carrington, F.L.S., C. Fenn, F.E.S., R. South, F.E.S., and J. W. Tutt, F.E.S.

FEBRUARY 12th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. C. G. Barrett, F.E.S., was nominated as a Vice-President.

Mr. C. A. Briggs exhibited four extremely large specimens of *Hepialus sylvinus*, L.

Mr. R. Adkin exhibited *Aplecta occulta*, L., bred during November and December last, from ova received from Forres in the previous August. The specimens were all of a light form, the pink shade in the primaries being strongly produced in many of them.

Mr. Tugwell exhibited *Melanippe hastata*, L., from Sussex and the Shetlands, and remarked on their wide divergence and the desirability of obtaining forms of a species from different parts of the country, in order to show the local variation.

Mr. Nussey exhibited a fine series of bred specimens of *Thecla pruni*, L., and called attention to a large female specimen that had emerged from the pupa without antennæ.

Mr. W. H. McLachlan exhibited lepidoptera taken by him at Aberdeen, including forms of *Polia chi*, L., dark forms of *Noctua xanthographa*, Fb., *Agrotis lucerneæ*, L., and *Epunda nigra*, Haw.

Mr. Billups exhibited *Trogus novæ-caledoniæ*, Montrouzier, a species of Dytiscus, the curious longicorn *Enicodes fichtelii*, Schr., and a very beautiful species of Cicindelidæ, *Caledonica lanigera*, Chau., and stated that the three species of Coleoptera seemed to be exclusively confined to New Caledonia. Mr. Billups also exhibited two species of Hemiptera from the same locality, *Tectocorix banksii*, Don., and *Mictis symbolica*, Don., and remarked that unlike the Coleoptera, these two species had a very wide geographical distribution, the former having been taken in Java, Australia, Timor, the Celebes, and Tonga; while the latter, in addition to the above-mentioned places, had also been met with in the New Hebrides and Ceram.

Mr. T. D. A. Cockerell exhibited *Arion ambiguus*, Pollonera, a slug new to Britain, of two forms: namely var. *armoricana*, Pollonera, from Sturminster Marshall, Dorset (found by T.D.A.C.), and a new form, *subalbida*, having the sides below the bands creamy white, from Bailey Gate, Dorset (found by Mr. W. Wallace). *Arion celticus*, Pollonera, from Rivarossa, Piedmont, Italy; received from Mr. C. Pollonera. *Malacolimax valentianus*, Férussac, from Barcelona; received from Mr. C. Pollonera; and read the following note on *Arion ambiguus*, Pollonera:—

“This species, of which specimens are now exhibited from Dorsetshire, has not yet been recognised as British. Very probably, however, the *Arion circumscriptus* of Johnston is identical with *ambiguus*, in which case Johnston’s name has priority. But I am disposed to regard *A. circumscriptus* and *A. bourguignati* as at most only subspecifically distinct, so that if we use this name (or perhaps preferably Nilsson’s name, *fasciatus*) to include all the British forms of the *bourguignati* group, we may then reserve the name *A. ambiguus* for the keelless subspecies; calling those with a keel, which

are also otherwise slightly different from *ambiguus*, by Mabille's name *bourguignati*. But aside from questions of nomenclature, the interesting fact remains that we have both subspecies in these islands."

Mr. Billups also exhibited a large number of miniature Mollusca, and read the following notes:—"It will be in the memory of many of us now present, that at a previous meeting Mr. Barrett was good enough to bring to the Society for distribution amongst the members, a quantity of sand, tidal drift, etc., which he had collected after a storm on the coast of South Wales, and finding it rich with Mollusca, Polyzoa, Hydrozoa, etc., thought perhaps some of the members would be glad to select specimens for their microscopes. Some fourteen or fifteen gentlemen availed themselves of Mr. Barrett's kindness, but I have not heard the result of their researches. Thinking that perhaps it might interest the Society, I have briefly jotted down my own slight observations and results. From a small portion of sand, the same as I now exhibit in the test tube, and in quantity about half of a small teacupful, I have found no less than sixty-one species of Mollusca, consisting of fourteen species of Conchifera (or Bivalves), and forty-seven of Gasteropoda (or Univalves). This does not include two species of Cirripedia (Barnacles or Sea Acorns), which till lately used to be classed with the Mollusca, on account of their shells, but are now universally admitted to be Crustaceans. As I have not had an opportunity to work out the whole of the species represented, I simply give the families and genera of the Mollusca exhibited. In the Bivalves we have eight families, represented by fourteen distinct genera as follows: The family Tellinidæ being represented by the genus *Tellina*; the Saxicavidæ by *Saxicava*; the Lucinidæ by two genera, *Lucina* and *Axinus*; the Kelliidæ by three genera, *Kellia*, *Lasæa*, and *Montacuta*; the family Mytilidæ having two genera, *Mytilus* and *Modiolaria*; the Pectenidæ being represented by one only, the genus *Pecten*; the Ostreidæ (or Oyster family) having two, the genera *Anomia* and *Ostrea*; the Carditidæ, by the genus *Cyamium*; the Cyprinidæ by *Circe*; and lastly the family Cardiidæ by the genus *Cardium*. Amongst the Gasteropoda we find a much larger number of forms, there being no less than eighteen families, represented by forty-seven species in twenty-seven different genera, as follows: The family Skeniadæ by the genus *Skenia*; the Patellidæ by the genera *Patella*, *Helcion*, *Acmæa* and *Capulus*; the Bullidæ by *Utriculus* and *Philine*; the

Scalariidæ by *Scalaria*; the Pyramidellidæ by the genus *Odostomia*, of which there are several species; the Naticidæ by the genus *Natica*; the family Littorinidæ, having two representatives in the genera *Hydrobia* and *Littorina*; the Lacunidæ by the genus *Lacuna*; the Rissoidæ by *Rissoa*, of which there are several species, and *Barleeia*; the family Cerithiidæ is represented by two genera, *Cerithium* and *Cerithiopsis*; as is also the Pleurotomidæ by the genera *Defrancia* and *Pleurotoma*. The family Trochidæ is represented by two genera, *Adeorbis* and *Trochus*; while *Phasianella* is the only genus doing duty for the Turbinidæ."

FEBRUARY 26th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. C. G. Barrett, F.E.S., was elected a Vice-President.

Mr. R. J. Anderson, was elected a member.

Mr. Adye exhibited an unusually dark form of *Notodonta camelina*, L., with other forms of the species.

Mr. H. J. Turner exhibited *Melanippe fluctuata*, L., taken in his garden at Brockley. The specimens showed considerable variation, and Mr. Tugwell remarked that Mr. Turner was extremely fortunate in obtaining varieties of this species, the variety figured in the Abstract of Proceedings for 1888-89, having been taken by him in his garden.

Mr. H. Moore exhibited a specimen of *Erebus odora* from South America.

Mr. E. Step exhibited a living wasp *Vespa germanica*, Fab., which he stated had some months previously taken up its abode in one of the pigeon holes of his desk and was still alive. Mr. Billups mentioned having once taken nine females of this species on Wandsworth Common as early as the 17th January.

Mr. T. D. A. Cockerell exhibited larvæ of *Heliothis armigera*, Hb., var. *umbrosa*, Grote, from Wet Mountain Valley, Colorado, a form larger than the type, the upper wings being more or less olivaceous above, and the under wings almost without markings.

Mr. C. Fenn exhibited examples of the genus *Triphæna* from Forres; Mr. McArthur, *T. comes*, Hb., from the Isle of Lewis, and *T. ianthina*, Esp., from Northumberland. Mr. Turner, *T. pronuba*, L., from Brockley, and Mr. South and Mr. Tugwell, varieties of many species of the genus.

Mr. R. Adkin exhibited long series of the species of the genus *Triphæna*, Och., from many localities in the British Islands, together with Continental series of some of the

species for comparison, and read notes respecting them (printed in full at the end of the Proceedings).

MARCH 12th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. E. F. Elton was elected a member.

Mr. Robinson exhibited two specimens of a *Pygæra*, which he thought were dark forms of *Pygæra curtula*, L. He said they were bred by a collector at Sittingbourne, and sold for a trifle; and he wished the opinion of members as to whether they were or were not *curtula*. Mr. Tugwell and Mr. Carington said they had seen the form before, and they were generally considered to be a variety of *P. curtula*. Mr. Tutt pointed out that the transverse lines were identical with the transverse lines of *curtula*, and so far as he knew there was no Continental species closely allied to *curtula*.

Mr. Tugwell exhibited series of *Hydrocampa nymphaæata*, L., from Kent and Yorkshire. The Yorkshire specimens being many shades darker than those from Kent.

Mr. R. Adkin exhibited *Pædisca solandriana*, L., bred from larvæ feeding in shoots of birch received from Aberdeen; and on behalf of Mr. W. Smith of Paisley, white and dark-blotched varieties of the same species, and an unusually pale form of *Crambus pratellus*, L.; also an extremely varied series of *Triphæna comes*, Hb.

Mr. R. South exhibited from the Cabinets of Mr. Leech, *Vanessa urticæ*, L., to illustrate the geographical distribution and local variation, including the Corsican form known as *ichnusa*, Bon., more or less typical specimens from America, specimens from Cashmere, N.W. China and Japan; the Japanese specimens being curiously banded. It was interesting to note that a form from Lapland appeared to be intermediate between the Japanese and ordinary European forms; some of the Chinese specimens were very large.

Mr. T. D. A. Cockerell read the following notes on the variation of *Phasianella pullus*, L., and *Littorina rudis*, Mat., in South Wales:—

“In 1887 Mr. F. W. Wotton sent me some forms of *Littorina rudis* from Llanelys, Glamorgan; and this year Mr. Billups has kindly submitted to me some specimens of *Phasianella* found in shell-sand brought by Mr. Barrett from Pembroke, S. Wales; so that I am able to give a short account of the mutations of these polymorphic species as they occur on the South Welsh Coast.

(1) *Littorina; rudis*, Mat.

a. forma nov. *aureola*. 10-12 millim. long, broadly subovate, aperture not or hardly angled above, colour orange-red, smooth, or obscurely ribbed. Llanelays, Glamorgan, described from 7 specimens.

b. forma nov. *albogrisea*. In shape and size like f. *aureola*, but in colour like f. *albogrisea*, Ckll. (*Zoologist*, 1887, p. 115) of var. *jugosa*, found in Co. Kerry, Ireland. Llanelays, Glamorgan, described from 12 specimens.

c. forma nov. *producta*. $15\frac{1}{2}$ -16 mill. long. $11\frac{1}{2}$ - $12\frac{1}{2}$ mill. broad, spire produced, mouth elbowed above, colour pale yellowish or greyish, thick, smooth. Llanelays, Glamorgan, described from 10 specimens.

(2) *Phasianella pullus*, L., all from Pembroke.

a. forma *bicolor*, Monterosato. With alternate transverse broad bands of white and red. A Mediterranean colour-variety, now first recorded as British.

b. forma *ziczac*, Cockerell. *Nat. World*. 1885, p. 218. White, with zigzag pink lines. Previously only recorded from Guernsey. Monterosato's variety *zigzag*, from the Mediterranean, is similar, except that the lines are black.

c. forma *millepunctata*, Cockerell. *Zoologist*, 1887, p. 116. Previously only recorded from Ireland.

d. a form with the markings pale brown instead of pink.

e. various forms, more or less typical, with no special well-defined varietal characters."

Mr. T. R. Billups read a paper on, and exhibited specimens of, Hymenopterous and Dipterous parasites bred by members of the Society during 1889-90.

MARCH 26th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. P. F. Skinner was elected a member.

Mr. C. Fenn exhibited *Tæniocampa incerta*, Hufn., bred from ova obtained at Lee, and read the following note. "These forms are mostly of very pale grey or brown tints, varied and banded with dark grey and purplish, and show a remarkable tendency towards the form of the parent ♀ also exhibited. Out of a number of nearly 100 imagines bred from the batch of ova, at least two-thirds follow the type of the parent ♀. As an incident I may say that the receptacle in which the pupæ were contained was exposed to the intense frost of last winter, and the moths emerged within a fortnight

of its breaking up. Although the black form of *incerta* is not scarce at Lee, not one was bred from this batch of eggs.

Mr. Tugwell, referring to Mr. Fenn's exhibit, stated that the brood did not always follow the form of the parent, and instanced *Acidalia aversata*, L., from a large brood bred from a captured female, not a single one followed the parent female, but, in reply to Mr. South, said he did not see the male.

Mr. South said he found that in breeding Lepidoptera the brood generally followed any peculiarity in either the male or female parent, but more especially the female.

Mr. Mansbridge exhibited a melanic specimen of *Phigalia pedaria*, Fb., which was taken in a boggy wood near Leeds.

Mr. R. South referred to the *Pygæra curtula*, L., exhibited at a previous meeting by Mr. A. Robinson, and remarked that a similar form had been recorded by Mr. Whittick, and an analogous variety of *P. pigra*, Hufn., had been figured by Stephens.

The remainder of the evening was devoted to an exhibition of microscopical objects by members.

APRIL 9th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. A. H. Hamm was elected a member.

Mr. R. Adkin exhibited specimens of *Pædisca sordidana*, Hb., from Forbes.

Mr. South remarked that these specimens were very unlike those from North Devon, which were larger and brighter.

Mr. South exhibited three specimens of *Miana strigilis*, Clerck, var *latruncula*, Lang, received from Mr. Jeffreys.

Mr. R. South said with regard to the *T. incerta*, shown at the last meeting by Mr. Fenn, that the majority resembled the female parent. On the whole question of variation he was inclined to think the law of inheritance had a great deal more to do with it than was generally allowed, and he referred to a recent record of pheasants with white plumage increasing year by year apparently from a single white specimen. Mr. Carrington remarked that change of environment or climate might lead to temporary variation in a species, but in his opinion, either a new form was developed, or there was a reversion back to the ancestral form. Mr. Fenn, with regard to his specimens of *incerta*, said, in his opinion, the variation was hereditary, and was not due to the surroundings of the pupa. As to alteration of colour in animals and insects, this

was due not to temperature or change of climate, but was a question of food and habit ; domestic animals were affected more by treatment and food than by heat or cold. Mr. E. Step referred to white and black rabbits being nearly as numerous as the ordinary grey form on Mickleham Downs and on Ranmore Common, and many specimens had been seen at Ashted and Epsom Commons. Mr. Tugwell endorsed Mr. Step's remarks, and said these white and black rabbits had gone on increasing in numbers during the last eight or ten years ; he also stated that he doubted much whether temperature had anything to do with producing variation in insects, and he thought that any change which took place in the colour, was produced in the larval stage, and was due to the food of the larva, and normal heat and cold would not cause any difference. Mr. Adkin said he was not prepared to admit, after carefully considering the conclusions arrived at from Mr. Merrifield's observations, that temperature did not in any way influence colour. Mr. Tutt remarked that, as he understood Mr. Merrifield's theory, excessive cold or excessive heat ought always to produce dark and pale insects respectively ; but Mr. Merrifield went further, and suggested altered shape and markings, which he (Mr. Tutt) could not admit ; besides the hereditary business, he thought that the continual inbreeding tended to produce unhealthy conditions, and therefore the alteration in colour and markings would be due to disease rather than to any other cause.

Mr. S. Edwards read a paper on the "*Papilionidæ*," which was illustrated by diagrams and Mr. Edward's extensive collection of this group.

APRIL 23rd, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. E. Sabel was elected a member.

Mr. Billups exhibited three cabinet drawers of life histories, representing many of the species of *Ichneumonidæ*, bred during the past four years by members of the Society. Also pupæ and imago of the very beautiful Cynipid, *Eulophus damicornis*, Kirby, bred from the larvæ of *Demas coryli*, L., by Mr. J. A. Simes, and remarked that he had called the attention of the Society to this species some six years since, when Mr. T. Williams bred the same species from the same host, as also from *Lophopteryx camelina*, L. ; Mr. Elisha had since bred it from the larvæ of *Lithocolletis bremiella*, Zell., and *L. faginella*, Mann.

Mr. Billups also exhibited, on behalf of Mr. Mansbridge,

galls on the *Hieracium*, and on birch collected in the neighbourhood of Leeds. Mr. Billups placed in the box what he stated was most probably the maker of the galls on the *Hieracium* (*Aulax hieracii*, Bouch.), which he had bred in some numbers from the narrow-leaved hawkweed (*H. umbellatum*), and also some specimens of a hyper-parasite, *Decatoma biguttata*, Swed. With reference to the galls on the birch, Mr. Billups said he was not certain as to the maker; but most probably it was a species of *Phytoptus*, belonging to the Acaridea (or Mites), many of which were gall-makers, and produced very curious plant deformities, e.g., on the birch, sycamore, lime, maple, alder, blackthorn, etc.

Mr. R. South exhibited a series of *Polyommatus phlæas*, L., among which were examples of the vars. *schmidtii*, Gesh., and *eleus*, Fahr., and some other interesting aberrations, together with representatives of the species from Europe, Asia, and Africa.

Mr. R. Adkin exhibited *Emmelesia albulata*, Schiff., from pupæ received from Shetland in the autumn of 1888, and said that in 1889, four only were bred, in 1890, upwards of twenty, including var. *griseata*, Stgr., and var. *thules*, Weir; he also exhibited pupæ of *Cedestis gysselinella*, Dup. Sta., in drawn-together fir needles, and larvæ of *Lithocolletis vacciniella*, Scott. Sta., mining underside of leaves of *Vaccinium*, both from Rannoch.

Mr. Tugwell exhibited *Larentia olivata*, Bork., from Portland and other localities, those from Portland being extremely pale as compared with the other examples. Mr. Tutt, remarking on pale forms occurring at Portland, instanced *Heliophobus hispidus*, Hb., and *Epunda lichenea* Hb.

Mr. Billups exhibited *Lasius flavus*, De Geer, and the curious little crustacean, *Platyarthrus hoffmanseggii*, which occupies the formicarium in company with *Lasius flavus*. Also the rose beetle (*Cetonia aurata*, L.), showing the position of the beetle in the cocoon after its change from the larval stage. Mr. Carrington remarked that these cocoons, which had been sent him from a correspondent residing near Banbury, were found in old thatch largely composed of clay, in which various plants were growing.

Mr. Billups then read the following notes:—"In the month of October last, my friend Mr. Williams kindly gave me larvæ of *Demas coryli*, L. and *Lophopteryx camelina*, L., infested with Ichneumons, or perhaps more correctly speaking, with a species of Chalcididæ. These parasitical larvæ burst

out of the body of the caterpillar when it was evidently full-fed, and just before assuming the pupa state; both caterpillars were fixed to the same leaf of beech by a single silken cord or web round the body, as though they were on the point of changing to pupa, when overtaken by death caused by their relentless little foes. These larvæ at once attached themselves to the same leaf by a glutinous secretion of a pale brown colour, as in the species of *Eulophus* observed by Geoffroy (*History of Insects*, vol. ii.), and to which family I think it very possible our little friends belong. They did not all emerge at the same time, the larvæ from *Demascoryli*, although amounting to only 17 in number, extended over a period of five days, and were of a semi-pellucid white, up to the time of changing to pupa, which took place in a few hours, they were then of a jet black colour; the larvæ from *L. camelina* being of a pale watery green colour on emerging, but as quickly changing to black; the pupæ appearing very wrinkled, and lying on their backs, with limbs showing very prominently, particularly the antennæ and legs, although apparently soldered tightly to the breast. According to Westwood, the majority of these insects pass the inactive period of their existence naked, and not enclosed in a cocoon, as do many other species of Ichneumonidæ, such as *Microgaster glomeratus*. In a state of nature these pupa most probably drop to the earth to undergo their final metamorphosis, as the least shake will disturb them, leaving the cast-off skin firmly attached to the leaf, secured by the gummy secretion. They also evidently eject small nodules of frass just before the change takes place, as there are several little clusters immediately round them. I know with what a large amount of prejudice many of my Lepidopterist friends look upon these parasites, as being almost as inveterate enemies to themselves as to the poor caterpillar. Mr. Westwood, in his *Modern Classification of Insects*, says that these insects are of vast importance in the economy of nature, by preventing the too great increase of different species of insects, especially of the caterpillars of butterflies and moths, of which they destroy a great number; it having been observed that a superabundance of any species of insects is attended with an increased production of its parasitic enemies. Perhaps it may be some slight consolation to my Lepidopterist friends, to know that, although their choice rarities are sometimes destroyed by these insect pests, they are not alone, for the Coleopterist's, as well as the Hymenopterist's and Hemipterist's specialities, are all liable to the same attacks, although perhaps

not on so extensive a scale. Ratzburg gives a list of no less than fourteen species of Ichneumon parasitic on spiders, while M. Audoin has obtained *Microctonus terminalis* from *Coccinella 7-punctata*, L., better known as the Seven-spotted ladybird, and M. Boudier describes two species of Braconidæ, the larvæ of which burst forth from the abdomens of specimens of *Barynotus elevatus* and *Otiorynchus lignarius* in the imago state which had been pierced with pins for preservation, and which spun their cocoons beneath the body of these weevils, attaching them to the pins. As I said before, the Hemiptera are not exempt, for we find the Aphides giving name to a genus called Aphidius. I have myself bred several species from both Hymenoptera and Diptera; and even in our own houses we have these little visitors come to prey upon the larvæ of Ptinidæ, as do *Spathus clavatum*, and several of the species Cryptus, while others are on the look out for the larvæ of Dermestidæ, Anthreni, Tineæ, and other domestic insects. Orthoptera again are subject to the same kind of parasites, for we find that unsavoury and certainly unpleasant-looking creature, the cockroach, attended to by the family *Evanidæ*; and, as though the insect inhabitants of the air and the earth were not enough in number for the Ichneumonidæ to revel amongst, we find them actually attacking the residents of the water. In the *Entomologist's Magazine*, vol. iii., p. 412, we find the following:—‘The female of the remarkable species, *Agriotypus armatus*, is stated to have been observed on the banks of the Clyde, to descend the sides of the rocks to a considerable depth under the surface of the water, remaining immersed for ten minutes and upwards, and then reappearing without any apparent injury, repeating the operation several times: these subaqueous excursions being probably for the purpose of depositing its eggs in some aquatic larvæ.’ The Rev. T. A. Marshall mentions 1,186 species of Ichneumonidæ as occurring in Great Britain; while Dr. Packard, in his *Guide to the Study of Insects*, states that there are over 2,000 described species in Europe, and probably an equal number in America, while Gerstæcker estimates that there are 4,000 to 5,000 species known; but to all who are interested in the economy of the Ichneumonidæ and its sub-families, I would strongly recommend them to read, if possible, first Westwood’s *Introduction to the Modern Classification of Insects*, and next Dr. Packard’s *Guide to the Study of Insects*, when I have no doubt that they will not only be highly interested, but instructed in the valuable economy of these much maligned, but very beautiful creatures.

Mr. R. Adkin exhibited living examples of the Warty Newt (*Molge cristata*, Bell & Cooke) and the Smooth Newt (*M. vulgaris*, L.), and said that he had heard a difficulty had been found by some members in distinguishing between the two species; but in reality they were most easily separable, especially during the breeding season—the time when they were most frequently met with—when the males of both species were strongly crested; in *cristata* the crest was much toothed, and the colour of the belly deep orange, spotted with black; whereas in *vulgaris*, the crest was festooned, and the colour of the belly pale orange, spotted with black.

Mr. Carrington stated that four specimens of the sandgrouse (*Syrnoides paradoxus*, Pall.), had been seen in North Scotland, and were probably survivors of those seen a couple of years ago; when seen they were in pairs.

Mr. Carrington exhibited and read notes upon Terrestrial Mollusca found near Toulon, France.

MAY 14th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Messrs. H. Rowland-Brown, B.A., F.E.S., G. Bird, F.E.S., F. E. Filer, G. W. Ruffle, A. E. Dewey and A. C. Forrester were elected members.

Mr. C. Fenn exhibited a moorland form of a *Tortrix*, and Mr. C. G. Barrett expressed an opinion that it was *T. costana*, Fb.

Mr. Tugwell exhibited bred *Lobophora viretata*, Hb., and remarked that all the brood were of the beautiful green type; those exhibited at a former meeting being all more or less yellowish in tone of colour.

Mr. Tugwell exhibited, on behalf of Mr. Collins, of Warrington, an extremely dark specimen of *Aplecta nebulosa*, Hufn.; dark form of *Acronycta rumicis* var. *salicis*, Curt.; and a variety of *Leucania lithargyria*, Esp., with almost white under-wings, having a strongly marked dark band.

Mr. Tugwell also exhibited, on behalf of Mr. J. E. Robson, a box of lepidoptera, containing, amongst others, varieties of the under side of *Lycena icarus*, Rott., *L. astrarche*, Bgstr., showing the full range of this species, *L. astrarche* var. *æstiva*, Std., var. *salmacis*, Stephens, var. *artaxerxes*, Fab., all from Castle Eden Dene, *Cænonympha pamphilus*, L., var. *albescens*, vars. of *C. typhon*, Rott., and *Abraxas ulmata*, showing extreme variations.

Mr. J. Jäger exhibited living larvæ of *Callimorpha hera*,

L., reared from ova obtained from a specimen captured in South Devon, 1890.

Mr. Carrington exhibited some orchidaceous plants from Eynesford, Kent, including the early purple orchis (*Orchis mascula*, L.), the green-winged meadow orchis (*O. morio*, L.), and the bird's-nest orchis (*Neottia nidus-avis*, Rich.)

Mr. Step and Mr. Tugwell made some observations relative to these plants; the latter gentleman remarking that the *O. mascula* shown was somewhat abnormal in growth and colour, and somewhat resembled the rare *Orchis militaris*. L.

Mr. J. W. Tutt read a paper on "Reproduction and Parthenogenesis." He explained, first of all, the methods of asexual reproduction by fission, gemmation and encystation in monads, the *Amæba*, and *Vorticella*; showed how both asexual and sexual reproduction occurred in *Hydra*, the former by gemmation and by artificial subdivision; the latter by the development of spermatozoa and ova. The reproduction of the common earthworm was considered, its hermaphroditism and method of copulation explained, showing how, by the arrangement of the spermathecia and male genital pores, common fertilisation was effected. The sexual reproduction of the cockroach was then considered, and lastly, that of insects generally. Referring to the asexual reproduction due to gemmation, the well-known parthenogenetic reproduction in *Aphis* was compared with that in *Hydra*, and the daughter-cells produced all the summer, in the former, were looked upon as a specialised form of gemmation; whilst the normal sexual reproduction appeared similar in both cases, excepting that *Hydra* was hermaphrodite, whilst *Aphis* had distinct sexes. Parthenogenesis and its influence on the sexes of bees was then mentioned, and the probability of parthenogenesis occurring in insects was discussed, with references to cases which, Mr. Tutt stated, seemed beyond dispute.

MAY 28th, 1891.

C. G. BARRETT, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. J. F. Palmer was elected a member.

Mr. C. Fenn exhibited a series of *Biston hirtaria*, Clerck., and stated that he had taken seventy in three-quarters of an hour in Finsbury Circus. Mr. South remarked that there were a great many cripples of this species this year.

Mr. Tutt exhibited a hybrid between *Amphidasys strataria*, Hufn., and *A. betularia*, L., with typical forms, and stated that the hybrid was obtained by Dr. Chapman, the pupa of

the latter species having been forced so as to cause it to emerge at the same time as *A. strataria*. Mr. Tutt also exhibited *Caradrina ambigua*, Fb., from Deal, and typical specimens of *C. taraxaci*, Hb., *C. superstes*, Tr., from Sligo and *C. superstes*, H.-S., from Yarmouth, Isle of Wight, and made some observations upon his exhibit.

Mr. Hawes exhibited a sketch of *Euchloë cardamines*, L., at rest on a blade of grass, and pointed out that its position was well adapted for keeping off the rain.

Mr. South exhibited specimens of *Vanessa antiopa*, L., from various parts of the palæarctic region, including India, China, Japan, Germany and France, and remarked that the American form was usually considered to present a more dusted appearance on the border, but that in some of the specimens from France now shown it was quite as much powdered as in any American specimens he had seen.

Mr. T. D. A. Cockerell exhibited *Vanessa antiopa*, L., var., the margins more irrorated with black, from Wet Mountain Valley, Colorado. The question of white and yellow bordered specimens was discussed, Mr. Cockerell saying that it was thought that the white-bordered specimens were hibernated ones. Mr. Adkin stated he had bred the species from American ova, and the borders were distinctly yellow. Mr. Barrett stated that in what was commonly called the *Antiopa* year (1872) all the specimens which he saw had white borders. Mr. South said that two Welsh specimens he saw had yellow borders. Mr. Tutt stated that he had seen five specimens (British), three of which were white and two yellow. Mr. Frohawk said that his sister had sent him a specimen from Brooklyn Park, New York, which had a pale border, and further said that on August 22, 1888, he had seen a specimen then recently taken which was quite yellow. Mr. Cockerell said it was a question whether the colours of living insects faded, and he did not know of any decisive evidence on the point. Mr. Barrett said the question was exemplified in the instance shown at last meeting of an insect turning from green to orange, viz., *Lobophora viretata*, Hb. Mr. Frohawk stated that the pigment of some insects was removable. He had had a species of *Catagramma*, which, on being relaxed, left a distinct deposit of colour on the blotting paper on which it was laid. Mr. Barrett pointed out that *Procris statice*, L., become coppery red under such conditions, but afterwards went back to its normal green colour.

Mr. R. South exhibited *Cidaria suffumata*, Hb., bred from

ova obtained from specimens captured at Dover; the series included typical forms, and the black-banded creamy form of the species; and Mr. South stated that he had had forty ova, and the larvæ were fed up part indoors and part outdoors. Those indoors came out a fortnight before the others; but each lot produced the Dover form, examples of the variety occurring in both.

Mr. R. Adkin exhibited *Endromis versicolor*, L., bred from larvæ fed up in 1888; and remarked that in 1889 two males only emerged, but in 1890 five females and one male came out, the male being the last to appear. In 1884 he also fed up some larvæ of this species; starting with twenty-five ova, he had reared twenty-one moths, which emerged as follows:—In 1885 one male and eight females, and in 1886 twelve males only; thus in each case the larger proportion of emergences had taken place during the second year after pupation. Mr. Dobson, referring to a brood of *Acronycta leporina*, L., said that the first year about 15 per cent., and in the second year 60 per cent. of the brood emerged. Mr. C. Fenn stated that Mr. Tester of Balcombe had informed him that *E. versicolor* sometimes remained in pupa for five years.

References were made to other species remaining in the pupal stage for more than one season; among others mentioned were *Eriogaster lanestris*, L., *Asteroscopus nubeculosa*, Esp., *Eupithecia venosata*, Fb., *Emmelesia albulata*, Schiff., *E. unifasciata*, Haw., and several species of the genus *Cucullia*.

Mr. T. D. A. Cockerell exhibited *Clausilia rolphii* from Plumstead, Kent, collected by the Rev. J. W. Horsley, of two forms:—(a) 12 millimetres long, $3\frac{1}{2}$ broad, horn-colour, shiny, rather tumid. This may be considered typical. (b) 13 millim. long, $3\frac{1}{2}$ broad, deep red-brown, shiny, not so tumid, striæ not quite so close together. Of this apparently undescribed form Mr. Horsley sent two specimens. The dimensions are the same as those of the var. *digonostoma* of Bourguignat.

Mr. E. Step exhibited nest and eggs of the willow warbler (*Phylloscopus trochilus*, L.), taken on the Society's excursion to Oxshot on the 23rd inst. It was also mentioned that at this excursion, which was conducted by Mr. R. South, many rare plants were found, and among the Lepidoptera larvæ of *Cymatophora flavicornis*, L., *Ellopiæ prosapiaria*, L., *Thera variata*, Schiff., and *T. firmata*, Hb., occurred sparingly; imagines of *Coremia ferrugata*, Clerck, *C. unidentaria*, Haw., *Melanippe sociata*, Bork., *Anticlea badiata*, Hb., *Cabera pusaria*, L., *Ematurga atomaria*, L., of which two or three nice varie-

ties occurred, Mr. Fruing Warne securing a black specimen of this species; and he was also fortunate enough to obtain a variety of *Tephrosia crepuscularia*, Hb., the ground colour being yellow. It was stated that none of these species were plentiful, and it was attributed to the lateness of the season and the extremely cold winds which were prevalent at the time. Mr. E. Step obtained a good many species of mosses.

JUNE 11th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. C. S. Bouttell exhibited a series of *Coremia ferrugata*, Clerck., and of *C. unidentaria*, Haw., and remarked that the latter species bred from the black-banded form in every case remained constant, while those from the red-banded form varied considerably.

Mr. Tutt exhibited two specimens of *Vanessa atalanta*, L., and remarked that five specimens were bred from larvæ collected by him at Deal; the specimens were remarkable in having the right superior wing very small, but perfectly developed; this, Mr. Tutt said, he attributed to a diseased condition of the larvæ.

Mr. Tugwell exhibited *Spilosoma mendica*, Esp., bred from ova received from Mr. Porritt; and specimens sent from Mr. Harrison as the normal form in the Barnsley district. Mr. Tugwell pointed out that the males of the species from Barnsley were paler and smaller than the usual southern form, and gradually toned down toward the var. *rustica*; whilst in those bred from the Huddersfield parent the males were blacker, and the females more spotted than the southern type of the species.

Mr. R. Adkin exhibited examples of club moss (*Lycopodium selago*) from Rannoch, and remarked that it was a mountainous species, and not found in the southern parts of England. Mr. Tugwell said it was common in the high wet mountains, both at Rannoch and at Braemar. Mr. C. G. Barrett remarked that he had once found this club moss at Haslemere on a heathy hill-side.

Mr. Ruffle exhibited an example of the masked crab (*Corystes cassivelaunus*). Mr. West (Streatham) said he had seen this crab off Hastings, and had found some dozens of them. Mr. Tugwell referred to his having taken on more than one occasion a quantity of oysters at Littlehampton, which were washed in shore from the beds, owing to rough weather.

Mr. T. W. Hall stated that he had larvæ of *Sesia myopiformis*, Bork., feeding in some pear-trees in his garden, and inquired as to the best means of securing the moths. It was suggested that the branches in which the larvæ were should be sleeved, and the moths taken out of the sleeves as they emerged. Some discussion arose as to the time of emergence of the imago from the pupa, and the general opinion seemed to be that it was during the early morning.

Observations were made on the backwardness of the season as regards Lepidoptera. Mr. Adkin stated that species one expected to find in some numbers were only represented by casual specimens. Mr. Fenn said he believed that at Reading things were plentiful, but personally he had found it a very bad season; the day before he had spent the afternoon at Tilgate Forest, and had only taken by beating four specimens of macro-lepidoptera, viz., 1 *Cabera pusaria*, L., 1 *Eupithecia castigata*, Hb., and 2 *Drepana lacertinaria*, L. There was nothing flying. He also referred to *Pieris rapæ*, L., as an exception to the general scarcity. Mr. Jenner Weir also referred to the abundance of this species, but added that he had seen no other butterfly on the wing. Mr. Adye stated that he had recently found *Heliaca tenebrata*, Scop., and *Euclidia mi*, Clerck, abundantly at Willesden; and Mr. Auld also said he had found many species plentiful in Kent.

JUNE 25th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. W. West (Streatham) exhibited bred specimens of *Sesia formiciformis*, Esp., and remarked on the species being apparently much attacked by a species of the Ichneumonidæ; he also stated that in his opinion many of the pupæ were lying over.

Mr. C. A. Briggs exhibited a specimen of *Pieris brassicæ*, L., bred from among pupæ received from Yorkshire, having one of the antennæ much smaller than the other, although fully developed.

Mr. Croker exhibited among others an example of *Coremia ferrugata*, Clerck., with one antenna pectinated and the other simple; there was also a difference in the coloration of the wings on the one side and the other. It was pointed out that the specimen was gynandrous.

The Secretary read a list, compiled by Mr. R. Adkin, of Lepidoptera taken on the Society's excursion to Eynesford,

Kent, on Saturday, the 20th June, conducted by Mr. John T. Carrington, which list is as follows:—

The Rhopalocera were represented by:—

Euchloe cardamines, L.

Gonepteryx rhamni, L., both ♂ and ♀. Also ova *in situ* on leaves of buckthorn, and young larvæ in same position.

Pieris napi, L., worn.

„ *brassicæ*, L.

Thecla rubi, L.

Cænonympha pamphilus, L.

Polyommatus phlæas, L.

Lycæna astrarche, Bgstr.

„ *icarus*, Rott., including a nice var. approaching the obsolete form, taken by Mr. South.

„ *argiolus*, L.

Syrichthus malvæ, L.

Nisoniades tages, L. The manner in which this species rests at night on the seed heads of knapweed was well observed.

Hesperia sylvanus, Esp.

Also larvæ of *Lycæna corydon*, Fb.

The following among the Heterocera were also noted:—

Hepialus humuli, L.

„ *lupulinus*, L.

„ *hectus*, L.

„ *velleda*, Hb.

Drepana falcataria, L.

Zygæna filipendulæ, L., imagines, pupæ, and half-fed larvæ.

Euchelia jacobææ, L.

Dianthæcia carpophaga, Bork., and larvæ.

Euclidia mi, Clerck.

„ *glyphica*, L.

Rumia luteolata, L., common by day, and swarming at dusk.

Selenia lunaria, Schiff. (1).

Iodis lactearia, L., common.

Acidalia ornata, Scop.

„ *subsericeata*, Haw.

Cabera pusaria, L.

„ *exanthemaria*, Scop. (2 or 3 only).

Bapta bimaculata, Fb.

Strenia clathrata, L.

Aspilates ochrearia, Rossi.

Emmelesia albulata, Schiff.

„ *decolorata*, Hb.

Eupithecia (subumbrata) scabiosata, Bork., a good species, and occurred commonly

Asthena candidata, Schiff.

„ *luteata*, Schiff.

Numeria pulveraria, L.

Lomaspilis marginata, L.

Melanippe montanata, Bork., abundant and variable, some nice forms taken, including one by Mr. Winkley, in which the central band was divided on costa.

Anticlea badiata, Hb.

Anaitis plagiata, L.

Camptogramma bilineata, L., just coming out.

Phibalapteryx vitalbata, Hb.

Crambus pratellus, L., abundant.

„ *chrysonuchellus*, Scop.

„ *hortuellus*, Hb.

Scoparia ambigualis, Tr., a pest day and night.

Larvæ of *Mimæsoeptilus teucarii*, Hb., were common on wood sage and of *Hyponomeuta cognatellus*, Hb. (?), on spindle, *Diloba cæruleocephala*, L., and several nests of *Eriogaster lanestris*, L., were found.

Among plants noted were the following:—

Adonis autumnalis, L.

Aquilegia vulgaris, L., and also white var.

Gymnadenia conopsea, Benth.

Helleborus viridis, L., and *Daphne laureola*, L., both in seed.

Epipactis grandiflora, Sow.

The following notes by Mr. Lewcock, as to the Coleoptera taken or noted on this excursion were also read by the Secretary:—

“On a patch of wild vetch I obtained three or four specimens of the pea weevil (*Bruchus atomarius*), a species I have previously taken at Sheire, in Surrey, and *Crepidodera rufipes* was very common. On going through the footpath of the woods I beat out several *Polydrosus undatus* from oak and birch. This species seems to be local; I find it at Highgate, also at Oxshot, and Mr. Chaney has recently found it at West Wickham. After turning out of the woods by some fields, and ultimately coming to the chalk downs, the party settled down for the afternoon. The herbage was not well adapted for sweeping, so I put up my umbrella and went in for beating. The border of the woods consisted chiefly of hawthorn, interspersed here and there with oaks and other trees. The bloom was gone off the hawthorn, but now and then a few odd patches showed themselves. My captures now were numerous. *Cistela murina* was exceedingly common, and I also took several *C. luperus*. Of *Toxotus meridianus*—a large longicorn—I captured two; and was very glad to see *Cryptocephalus lineola* tumble into the umbrella; and soon afterwards a second specimen. One of the members spied another species of *Cryptocephalus* sitting on a flower on the slope, and kindly handed it over to me. The species was the pretty green *C. aureolus*. Later on, I managed to get another by sweeping the long grass at foot of the slope. Mr. Adkin also brought me two *C. labiatus*. Mr. South netted *Dascillus cervinus*, a species which generally occurs on chalk. Other captures during the afternoon were—four

Otiorhynchus tenebricosus, 1 male *Drilus flavescens*, several *Rhynchites æquatus*, 20 *Telephorus fuscicornis*, 5 *Dascillus cervinus*, 1 *Apion pomonæ*, and a lot of commoner species."

Mr. Tugwell communicated notes of a botanical ramble from Leatherhead, over Mickleham Downs, to Dorking, illustrating his remarks by examples of the plants collected, and referring to the larvæ of the Lepidoptera which were to be found feeding upon them. Mr. Tugwell said:—

"To attempt to treat the science of botany in one short paper would be simply impossible, but it appeared to me that a practical lesson might be imparted by taking a ramble the day before the meeting, collecting all the characteristic plants of the district to exhibit, and naming them, making such short remarks on each species as would tend to make them of some interest to our members. With that object in view, I yesterday took a botanical ramble from Leatherhead to Mickleham over the Downs to the top of Headley Lane, and thence on to Burford Bridge. In this walk I filled a large vasculum with about 100 species of plants. Of course, many of them were common, intentionally so; still, a few were really rare British plants. In this summary it is not intended to give anything like a complete list of the plants exhibited, as a mere list of names would be of no interest unless illustrated by the specimens. The only plant of note found in the valley of the Mole was the rare and local *Cynoglossum montanum*, Lam., = *sylvaticum*, Hawk. An old wall produced *Parietaria diffusa*, Koch., *Hieracium pilosella*, L., and *Saxifraga tri-dactylites*, L. Under the beech trees on Mickleham Downs, *Cephalanthera grandiflora*, Bab., was plentiful, and after a long search I managed to find a few of the much rarer species, *C. ensifolia*, Rich. Fifty years previously I had gathered this species abundantly there; but the trees had now grown up so as to almost destroy the locality for it. *Cynoglossum officinale*, L., with its lurid red head of flowers was common; whilst great beds of *Epilobium angustifolium*, L., gave promise of beautiful spikes of bright blossom in the near future. Fine plants of *Atropa belladonna*, L., *Helleborus fœtidus*, L., and *Daphne laureola*, L., were dotted about pretty freely.

"The open part of the Downs was a perfect blaze of bloom, masses of the golden *Helianthemum vulgare*, Gært., *Veronica chamædrys*, L., *Viola hirta*, L., and *Polygala vulgaris*, L., in endless variation of colour, with the beautiful foliage of *Spiræa filipendula*, L., and *Poterium sanguisorba*, L., formed together a most charming picture, surrounded

as it was with the grand old beech trees in their early summer foliage, and the more sombre hue of the spreading yews, a veritable naturalist paradise. Lepidoptera, too, were abundant; a tap at the beeches when out flew *Carpocapsa grossana*, Haw., in plenty, also *Zonosoma trilinearia*, Hb. and from the old junipers, here abundant, the larvæ of *Eupithecia sobrinata*, Hb., in any number. By turning our attention to the yew trees, the larvæ of *Boarmia abietaria*, Hb., *Lithosia deplana*, Esp., and an occasional *Aventia flexula*, Schiff., may certainly be secured. Hereabout, Mr. Samuel Stevens first turned up the rare *Pachetra leucophæa*, View., and from the berries of the old yews on the opposite height of Norbury, *Dasyampa rubiginea*, Fb., was found in some numbers by the late Mr. Walton.

“But to return to the flowers. On the partly cultivated ground beyond the Downs a few plants of Venus’ looking-glass, *Specularia hybrida*, D.C., *Anagallis cærulea*, Smith, and the curious ground pine, *Ajuga chamæpitys*, Schreb., occurred; and at the old station I was fortunate enough to meet with two specimens of *Lilium martagon*, L., in bloom; it was quite a chance to meet it in flower. Several orchids were collected, the most plentiful being *Gymnadenia conopsea*, Brown; and the pretty little *Herminium monorchis*, Brown, was in profusion in one locality—hundreds might be seen. Only a few *Aceras anthropophora*, Brown, were found, and no bee orchis, this in some seasons being very common there. The old wall in Headley Lane produced *Lactuca muralis*, Fresen., and *Arabis sagittata*, D.C., whilst the hedge banks near Burford Bridge station yielded *Chelidonium majus*, L. This finished my ramble, which I have tried to illustrate by the living plants.”

The plants were distributed to the members present.

JULY 9th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. C. A. Briggs exhibited a melanic specimen of *Sphinx ligustri*, L., from the London district.

Mr. W. H. Tugwell exhibited *Sesia sphegiformis*, Fabr.; also sticks of alder, showing pupa cases *in situ* from Tilgate Forest, and remarked that for the past fifteen years he had taken this species in small numbers; but that this year he had been so fortunate as to find thirty pupating larvæ in a few hours. He bred some females in the middle of June, and by assembling had captured twenty fine males. The

larvæ feeds three years inside the stem of alder, and always near the ground.

Mr. Oldham exhibited a light form of *Argynnis euphrosyne*, L., a yellow variety of *Pieris rapæ*, L., and a dark variety of *P. napi*, L. Mr. Carrington asked Mr. Oldham if he had noticed when taking varieties whether they were being mobbed, it being recorded that varieties were mobbed, and hence the specimens captured were often in a very weathered condition. Mr. Oldham replied that when taking the specimens exhibited, no other insects were near them. Mr. C. G. Barrett stated that he had never seen varieties mobbed, but that gynandromorphous specimens were said sometimes to attract the attention of numbers of their own species.

Mr. R. Adkin exhibited larvæ of *Euclidia glyphica*, L., reared upon white clover, from ova obtained from a moth taken by Mr. J. T. Carrington at Eynesford in May last.

Mr. R. Adkin also exhibited, on behalf of Mr. E. Sabine of Erith, a series of *Lycæna icarus*, Rott., collected at Snodland during the spring of this year, and showing great variation. Among the males were included specimens closely approaching the colour of *L. bellargus*, Rott., and one in which the black marginal dots extended into the fringes. Var. *icarinus*, Scriba., was well represented. Among the undersides, one specimen in colour and size of ocelli resembled *L. bellargus*; another was of a smoky grey colour, the white rings of the ocelli being absent; while in a third the spots in the primaries were elongated into black streaks, and those of the secondaries were partially so distorted. Among the females were many very blue forms, some of them being also strongly splashed and streaked, and in two of the undersides the basal spots were absent; these also showed considerable variation of ground colour.

Mr. Billups exhibited specimens of both sexes of *Pimpla gravenhorstii*, Tasch., and *Anomalon cerinops*, Gr., bred by Mr. Adkin from *Psodos coracina*, Esp., the larvæ being from Rannoch; also the very handsome Dipteron *Cynomyia mortuorum*, L., taken by himself at Oxshot on the 7th inst.

The Rev. J. W. Horsley exhibited, and remarked on, a splendid series of land shells, chiefly those of *Helix nemoralis*, L., and *H. hortensis*, Mull., in almost every possible variety of banding and colouring. He had made a list of 89 band varieties. He also exhibited specimens of *Helix elegans*, from Dover, and stated that it only occurred in one or two extremely restricted spots, to which it had doubtless been introduced either by accident or intentionally; probably the

latter, the species being hitherto unknown as an inhabitant of these Islands.

JULY 23rd, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. Dennis exhibited strongly-banded examples of *Spilosoma lubricipeda*, Esp., taken in his garden at Hackney, and remarked that he obtained this form every year.

Mr. Hawes exhibited pupæ of *Pararge megæra*, L., and remarked that out of a brood of about five dozen larvæ, reared from eggs obtained about June 12th, he had obtained a form of the pupa which would seem to have hitherto escaped notice, viz., a sooty black variety relieved only by a double dorsal chain of chrome yellow spots. About one-fourth of the brood were of this form, and four or five others had the usual emerald colour replaced by a darker and duller shade of green. Although so different in the pupa state the resulting insects from the whole brood of larvæ showed no variation as between black and green pupæ, but the imagines from the black differed *inter se*, as did also those from the green pupæ. It was interesting to add that the empty cases of the black pupæ retained their dusky appearance, while those of the green pupæ were, as usual, almost transparent.

Mr. Turner exhibited *Bupalus piniaria*, L., bred from larvæ taken at Westerham, showing pale and dark forms of the female. Mr. Barrett remarked that the white northern form of this species might be considered the type, as it occurred over a much larger area than the darker southern form, and was also more frequent on the Continent.

Mr. Waller exhibited, among others, bred specimens of *Aplecta tincta*, Brahm., *Eupithecia venosata*, Fb., and *Dianthæcia carpophaga*, Bork., from the southern counties. Mr. Barrett, referring to the last-named species, made some remarks on their interesting stages of variation, and called attention to one of the specimens having an abnormal additional wing.

Mr. Billups exhibited several species of British Diptera, amongst which were some of comparative rarity. *Sapromyza decempunctata*, Fln., two specimens taken in his own garden at Dulwich on the 8th of June, 1890, and a solitary specimen from Oxshot, taken the 11th July, 1891. Also two specimens of *Chlorops hypostigma*, Meig., taken in June and July respectively last season in his garden; this latter species not being recorded in Mr. Verrall's *List of British Diptera*, published in 1888. *Pachygaster leachii*, Curt., two specimens

of this rarity were taken in his garden on the 16th of July last year; another being bred from a pupa found at the same date. *Pipunculus geniculatus*, Mg., a female of this rare fly was taken by Mr. Billups at Oxshot, Surrey, on the 11th of the present month; also several specimens of *Oxyphora arnicæ*, L., taken at the same locality. A fine series of the rare and exceedingly pretty dipterous *Pteropactria afflicta*, Meig., and *Trypeta florentia*, Meig., were also shown, they having been taken by Mr. Billups at Oxshot in a little cutting, where they absolutely swarmed, on the 11th of this month. Mr. Billups also exhibited *Volucella bombylans*, L., and its puparium, and *Homalomyia fuscata*, Fln., with its puparium, obtained from a *Bombus* nest received from Aberdeenshire.

Mr. T. R. Billups also exhibited an egg of the Nightjar (*Caprimulgus europæus*, L.) from Oxshot, Surrey.

Mr. Step remarked on the difficulty of finding the egg of this bird owing to its resemblance to the ground upon which it was laid; the one exhibited by Mr. Billups was much more strongly marked than was usual. Mr. R. Adkin said he had on several occasions found the eggs at Oxshot after flushing the bird, by carefully searching the ground near the place where the bird rose, the egg would be seen, and it was invariably about a foot from the trunk of a fir tree. He confirmed Mr. Step's remarks as to the manner in which the egg harmonised with the bare ground on which it was laid, the bird making no attempt at the formation of any nest whatever.

AUGUST 13th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. J. Jenner Weir exhibited cases containing living larvæ of *Psyche villosella*, Och. (the produce of eggs of July in the present year), the cases from which the imagines had emerged, bred from eggs of 1889; and the perfect insect; and contributed the following note:—

"The males of *P. villosella* emerge from the cases about the latter end of June or during July, leaving the empty pupa skin projecting from the case about one-third of an inch; the female in most instances does not leave the case, but clears the emergent end by pressing herself out about a quarter of an inch; the male appears to be able to fertilize the female by forcing his body into the case, and thus reaching the female. The abdomen is singularly extensile, increasing to more than double its length at emergence.

"The female, after fertilization, withdraws herself within the case, and deposits her eggs at the bottom of the old pupa skin, where they remain until the young are hatched. I could not ascertain how many days the eggs remained there before the young appeared, but should think about ten or twelve, probably varying somewhat according to the heat of the weather. The old pupa skin remains in the case after the appearance of the young larva; but I could not find any trace of the skin of the female imago, and I am inclined to think that it is eaten by the young larvæ. From some of mine the young larvæ swarmed out of the case at the emergent end, which, I may here remark, is the reverse of the feeding end. Others I cut open, and released the young larvæ; they were at once very active, and moved quickly about, the bodies held at an angle of 45° . I could not see that they used any prolegs; locomotion was effected entirely by their true legs. They at once begun to make themselves cases, and in three or four hours were all furnished with clothing; for this purpose I supplied them with fine strips of heath and small pieces of moss. Although generally found on heath, they seem in their earlier stages to prefer more succulent food, such as bramble, strawberry, whitethorn, and sloe.

"During the whole of last winter I had some fifty larvæ, collected in 1890, the produce of the eggs of 1889, feeding on my lawn, under a large framework covered with net in the usual manner. They were quite unaffected by the severity of the winter, and almost all survived till the spring; but it is a singular fact, that although they had been protected from enemies for more than a year, yet many of them produced ichneumons, which must have lived in their hosts since July, 1890, at least. The females, if removed from the cases, are the most helpless imagines I ever saw, far more so than *Psyche nitidella*; they have neither eyes, mouth, antennæ, legs, or wings, and merely wriggle very slightly, and continually make an annular constriction of their bodies, which slowly passes down from the head to the extremity of the abdomen. Although in this country there are several species of Heterocera in which the female is apterous, yet in all these instances the legs are developed, and some traces of the wings, except in *Psyche*, are found. In no case is an apterous male known; but I saw, nearly fifty years ago, a moth taken by Mr. Darwin in Kerguelen's Island, which was apterous in both sexes."

Mr. J. Jenner Weir also exhibited *Pyrameis degeerii*, Godt. and remarked that it would be seen that the male was

scarcely, if at all, to be distinguished from *P. cardui*, L.; the female, on the other hand, resembled a faded *P. atalanta*, L.

Mr. J. H. Carpenter exhibited a very finely marked variety of *Epinephele hyperanthes*, L. (male), the spots on the under-side being unusually large and much elongated, also strongly shown on upper side. Also a bred series of *Melitæa athalia*, Rott., very varied in markings, reared from larvæ taken in Essex.

Mr. C. Fenn exhibited a female specimen of *Odonestis potatoria*, L., with unusually dark coloration, from Deal.

Mr. W. West and Mr. C. H. Watson exhibited bred examples of *Apamea ophiogramma*, Esp.; the latter gentleman also showing bred series of *Ocneria dispar*, L. Mr. Carrington stated that many years ago the larvæ were discovered in the nursery of Messrs. Backhouse of York, feeding on imported whitethorn. Mr. J. Jenner Weir remarked that the species was a growing evil in America, and steps were being taken to prevent its increase.

Mr. C. A. Briggs exhibited *Heliothis peltigera*, Schiff., two dark varieties from Devon, one pale from Tuddenham, Norfolk, and another from Folkestone, and asked whether both forms had ever been taken together.

Mr. Herbert Williams exhibited a gynandromorphous specimen of *Pieris rapæ*, L., taken by him at Box Hill, Surrey.

Mr. F. Hawes exhibited living larvæ of *Syrichthus malvæ*, L., and *Nisoniades tages*, L.

Mr. Frohawk exhibited bleached examples of *Epinephele ianira*, L. Mr. Carrington said that he questioned very much whether this form arose from artificial causes; he was inclined to think it was hereditary, and mentioned that in a certain locality in Essex it was possible to obtain many of these so-called bleached specimens, while in other parts of the county they did not seem to occur.

Mr. Tugwell exhibited *Nephopteryx abietella*, Zinck., bred from Scotch fir shoots, received from the neighbourhood of Aberdeen; also dark varieties of *Pyralis farinalis*, L., and a curiously streaked variety of *Botys urticalis*, Schiff.

It was reported that the excursion on the 25th ultimo to Leigh, Essex, under the guidance of Mr. Tugwell, was most successful, *Hesperia lineola*, Ochs., being extremely abundant; many other good local species were obtained.

AUGUST 27th, 1891.

W. H. TUGWELL, Esq., Ph.C., *Pr sident*, in the Chair.

Mr. W. H. Tugwell exhibited a series of *Bryophila perla*, W.V., showing great variation—all Kent examples. Those selected from Deal showing orange coloration; others collected by Mr. Austen, at Folkestone, being all very dark; the usual white ground colour of the wings being replaced by a dark greenish grey shade, giving the specimen a peculiarly dark appearance.

Mr. Tugwell also exhibited on behalf of Mr. J. E. Robson of Hartlepool, a series of *Lycæna astrarche*, Bgst. (*agestis*, Hb.), collected this season in Durham, and showing the species in all its forms from one district, from the southern form of *agestis* to the intermediate generally known Durham form *salmacis*, St., and then to the *artaxerxes*, Fab., form. He remarked that at one time these were looked upon as three distinct species, but were now known as one. In one of the specimens the usual white rings round the black spots or the ocelli were entirely wanting.

Mr. Turner exhibited a bred series of *Hypsipetes sordidata*, Fb. (*elutata*), fed on a mixed diet of hazel, whitethorn and willow; showing the red, pale, dark, and banded forms; also a living larva of *Stauropus fagi*, L.

Mr. S. Edwards exhibited examples of the genus *Charaxes*; and read the following note:—

“The genus *Charaxes* from its wide distribution forms one of the most interesting genera of the Nymphalinae. One species is found in Europe, on the Mediterranean shores; it also inhabits eastern, western, and southern Africa; Madagascar has some species, and the genus is common in Continental India, Ceylon, and the Andaman Islands, through Burma and the Malay Archipelago; very limited in the Pacific Islands, but occurs in Australia, and in single species in Fiji and New Caledonia. About fifty out of eighty known species occur in the Ethiopian region, eight being peculiar to Madagascar, and fifteen to South Africa, out of which the coast of Natal produces ten. They are the fastest flyers of the Nymphalinae. The larvæ are finely granulated, thickened about the middle, attenuated towards the tail, spineless, head large, wide, flattened, crowned with four spinose horns, anal segment more or less bifid. Pupa very thick, rounded, smooth; back convex; head bluntly bifid; anal segment with two small tubercles inferiorly, and four others at its extremity, round base of pedicel; back of thorax globosely prominent. The

smooth spineless larvæ with bifid tails superficially ally *Charaxes* with the *Satyrinæ*.

The species of this genus come to sugar. The larva of *Charaxes jasius* feeds on the strawberry tree (*Arbutus unedo*) from May to August, it is figured in Lang's plate xxxvi. As far as construction goes, *Charaxes* comes near the South American genera *Aganisthos* and *Agrias*, being the most massively formed of the known *Nymphalinae*.

Mr. C. Fenn exhibited *Odontia dentalis*, Schiff. (bred from *Echium*), *Hyria muricata*, Hufn., *Anerastia lotella*, Hb., *Crambus uliginosellus*, Zell., *C. contaminellus*, Hb., and *Sericoris conchana*, Hb., from Deal and neighbourhood.

Mr. Mera exhibited living larvæ of *Acronycta tridens*, Schiff., from Felixstowe, and remarked on the difference between them and *A. psi*, L.

Mr. F. W. Frohawk exhibited *Pieris napi*, L., from the New Forest, Balham, and Aldershot; three female specimens showing gradations in the formation of an additional spot between the third and fourth nervules; one male specimen entirely white above. Mr. Frohawk also exhibited a banded form of *Pararge megæra*, L., taken at Chattenden, in 1861.

Mr. J. H. Carpenter exhibited bred examples of *Thecla rubi*, L., having the undersides strongly marked with white spots.

Mr. W. West exhibited the pale variety of *Gnophos obscuraria*, Hb., from Lewes, Sussex, and a specimen of *Mania typica*, L., with two tibiæ and tarsi on the left front femur.

Mr. Billups exhibited several species of scarce British Diptera; amongst others, *Nemoræa strenua*, Meig., taken at Oxshott on the 11th July last: as regards this species Mr. Billups stated that at p. 230 of the current *Ent. Mo. Mag.*, Dr. Meade described this species as not common, he had taken both sexes in Oxfordshire in 1883; it was also in Miss Decie's collection, captured at Westward Ho, and one specimen was captured by Mr. Harwood of Colchester. *Eristalis sepulchralis*, L., a male of this scarce Dipteron was taken at Plumstead by himself, on the 17th July last; also a female of *Hypoderma bovis*, Deg. He said, with reference to this species, that "it was very rare indeed to find it in the perfect or imago stage; it belonged to the sub-family *Æstridæ*, Leach (Bot-flies, Breeze-flies). The larvæ living in sub-cutaneous galls or bots beneath the skin of various animals; the larvæ of the species shown being found in the month of May in galls or tumours on the backs of cattle; when fully-fed, which

is mostly in July, they work their way out, and fall to the ground to pupate, the state of pupation lasting some twenty-five or thirty days; the species is to be found in all parts of the civilized world. It is a curious coincidence that Mr. Bignell in this month's *E.M.M.* records the capture of this species on the 9th June, on a moor between Yelveston and Clearbrook; our member Mr. Coryndon Matthews having identified the species both for Mr. Bignell and myself. *Phytomyza aquilegiæ*, Hardy. This small species of Dipteron was reared by myself from some mined leaves of *Aquilegia vulgaris*, L. (the Common Columbine) growing in my own garden, the leaves being picked last September and kept until the following April, when the little fly began to emerge, its pretty little parasite *Rhizarcha ærolaris*, Nees., not emerging until nearly a month later."

Mr. Billups also exhibited both sexes of the very handsome *Polysphincta varipes*, Gr., which he had reared from a cluster of cocoons presented to him by Mr. C. Fenn, and obtained from the larvæ of *Odonestis potatoria*. Also a cocoon of *Attacus cecropia*, from New York State, given to him by Mr. Turner on the 4th May last, from which he had reared no less than forty-eight specimens of a species of *Cryptus*, closely allied to our British species *Cryptus digitatus*, Gmel.; there were thirty-four females and fourteen males. Mr. Billups called attention to the curious arrangement of cells formed by this internal parasite in the cocoon of *Attacus*, the outer circle consisting of twelve cells, the second of eight cells, and the third or inner one of four, so there must have been at least some forty-eight or fifty cells or internal puparia, which certainly seems enormous considering the large size of this handsome species of Ichneumon.

Mr. H. A. Sauzé exhibited among others the following species of Coleoptera:—

Clivina fossor, L., *Callistus lunatus*, F. (taken by Mr. C. Oldham), *Sphæridium scarabæoides*, L., *Quedius fuliginosus*, Gr., *Necrophorus vespillo*, L., *Endomychus coccineus*, L., *Halyzia 22-punctata*, L., *Elater balteatus*, L., *Clerus formicarius*, L., *Pyrochroa serraticornis*, Scop., *Molytes coronatus*, Lat., *Hylobius abietis*, L., *Cryptorhynchus lapathi*, L., *Attelabrus curculionoides*, L., *Crioceris asparagi*, L.

Mr. Perks exhibited specimens of *Physa fontinalis*, L., from the Wandle, and called attention to a parasite which affected this snail.

Mr. Tugwell exhibited the Autumn Squill (*Scilla autumnalis*, L.), with bulb, showing root leaves, from Blackheath.

Mr. J. T. Carrington recorded a case of gynandromorphism in a mackerel which had been sent to the *Field* from Wolverhampton. He remarked that such a thing was of exceedingly rare occurrence. The specimen had on the one side the roe nearly ripe, and on the other a full milt.

SEPTEMBER 10th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. W. F. Robinson was elected a member.

Mr. A. Short exhibited varieties of *Arctia caia*, L.; in one example the white markings of half of the superior wings were absent. Mr. Short called attention to the fact that the ordinary cream markings of many of the specimens he exhibited were strongly tinged with a rosy colour. Mr. Tugwell remarked that he had noticed this when breeding the species. Mr. J. Jenner Weir said he had once seen a series of this insect arranged according to whether the antennæ were of a whitish or blackish colour; he thought it would be of interest if members would look at their specimens and see whether there were any with antennæ of the latter colour.

Mr. Tugwell exhibited examples of *Melitæa aurinia*, Rott., from English, Irish, and Scotch localities, and remarked that the Irish examples were the brightest coloured, and that the Scotch had a greyish tone.

Mr. Frohawk exhibited a bred series of *Polyommatus phlæas*, L., and remarked on the advantage of rearing this species from ova, as those bred were very much larger than captured specimens.

Mr. E. Joy exhibited a melanic specimen of *Boarmia repandata*, L., taken by him at Hampsfelt, near Grange. Mr. Tugwell remarked that it was the same form as Mr. Porritt got in the Huddersfield district. Mr. Tutt stated that Mr. Porritt obtained these black specimens from a very dark fir wood, and inquired whether the specimen now exhibited came from such a wood. Mr. Joy in reply said he captured his specimen on the trunk of a larch tree, on the edge of a larch plantation, which was not at all dark; in addition, the specimen was very conspicuous on the tree trunk.

Mr. R. Adkin exhibited a series of *Psodos coracina*, Esp., bred this spring from Rannoch, and he pointed out that in some of the specimens the band was cut right through.

Mr. C. Fenn exhibited a long series of *Agrotis corticea*, Hb., showing the variation of the species at Deal. Mr.

Tugwell and Mr. Weir remarked that many of the specimens ran extremely close to *A. cinerea*, Hb., in character.

Mr. Rice exhibited a white variety of a linnet (*Linota cannabina*, L.), and said that he was inclined to think it had gone white through age.

Mr. Billups read an extract from the *Pall Mall Gazette* as to the number of wild plants that were to be found on the piece of vacant ground near Whitehall Place, and Mr. Carrington said he had himself frequently noticed the rapidity with which wild plants sprung up on land rendered vacant by the pulling down of buildings; he in particular referred to a piece of land in Victoria Street, Westminster. It would, he continued, be interesting for members with botanical tastes to visit vacant land and make a list of plants. Mr. Carrington concluded his remarks by some observations as to the means by which the seeds were introduced to land upon which buildings had previously stood for very long periods of time.

SEPTEMBER 24th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. R. South, referring to the remarks of Mr. Jenner Weir at the previous meeting, said he had looked through his series of *Arctia caia*, L., and he had none with black antennæ, but in Mr. Leach's collection was one from Japan, and one which was evidently English, having black antennæ. All the specimens from Japan had more or less darkish antennæ, the shaft not being so white as in European specimens.

Mr. Tugwell exhibited two English specimens of *Arctia caia*, with black antennæ, from his collection. Mr. Weir remarked that the antennæ were not positively black, but were sufficiently dark as compared with the typical form to be called so.

Mr. J. H. Carpenter exhibited blue forms of the female of *Lycæna icarus*, Rott., from Littlehampton, Sussex. Mr. Jenner Weir stated that this form occurred throughout the whole of Sussex.

Mr. H. W. Barker exhibited a specimen of *Leucania albipuncta*, Fb., taken at Folkestone, Kent, during the month of August, and he also exhibited pale ochreous forms of *Bombyx castrensis*, L.

Mr. J. Jenner Weir exhibited a specimen of *Bombyx mori*, L., bred from a cocoon found by him on a mulberry tree growing in his garden at Beckenham, Kent, and remarked that the cocoon was placed against the trunk, and had not

the usual loose silk around it. The moth emerged in the early part of the month, which was exceedingly late for the species. He had made every possible inquiry to ascertain whether any one in the neighbourhood had been rearing silkworms, but no one appeared to have been doing so, and it was impossible to account for its appearance. The fact was notable because the larva must have travelled some distance, a very unusual circumstance in this domesticated insect. Mr. Tugwell and Mr. R. South remarked on the wings of the specimen being fully developed, which was not usual with those reared in captivity; Mr. South adding, that in Japan there were two forms—a domesticated one and a wild one; it was possible that some one in the vicinity of Mr. Weir's house might have been rearing this wild form.

Mr. W. H. Tugwell exhibited specimens of *Epinephele tithonus*, L., from Devonshire, with three distinct ocelli in each superior wing, and a specimen of *Epinephele ianira*, L., from Inverurie, Aberdeenshire, with an extra ocellus.

Mr. Tutt remarked that Major Still had recorded the existence of this form of *Tithonus* in Devonshire; Mr. Frohawk had taken it at Chattenden, Kent; Mr. Carrington in Essex; Mr. Hawes had received it from Devon and Norfolk; Mr. Briggs had taken it at Wandsworth and Wimbledon. Mr. C. G. Barrett said, however, that although he had examined large numbers of the species in Pembrokeshire, and found many with varying numbers of additional dots, he had never found any specimens so strongly marked as were those of Mr. Tugwell.

Mr. R. Adkin exhibited sundry species of Lepidoptera bred during the present year from a miscellaneous lot of larvæ received from Forres in the previous autumn, including *Notodonta dictæoides*, Esp., *N. dromedarius*, L., *Odontopera bidentata*, Clerck., *Drepana falcataria*, L., *Hypsipetes trifasciata*, Bork., *Cidaria corylata*, Thnb., *Cabera pusaria*, L., and *Cymatophora duplaris*, L., together with specimens of some of the species from the South of England for comparison, and drew attention to the much brighter markings in the Forres examples of *falcataria* and *bidentata* than in the southern specimens of the same species; also to a specimen of *pusaria* in which the first and central lines were very close together, a feature regarded as indicating the form *C. rotundaria*, Haw. Also bred specimens of *Dianthæcia nana*, Rott., from Forres and North Devon which approached each other somewhat closely in tone of coloration, and stated that in an insect apparently liable to considerable local varia-

tion it was remarkable that examples from such widely different localities should bear such a close resemblance to each other.

Mr. C. G. Barrett remarked with reference to Mr. Adkin's observation as to the variety of *C. pusaria*, which had been considered to be a species, and known as *C. rotundaria*, that Mr. Atmore had bred a long series of *pusaria* in which there was every possible form intermediate between ordinary *pusaria* and *rotundaria*, one specimen being even *rotundaria* on one side and *pusaria* on the other. Mr. C. Fenn thought that larvæ of *pusaria* often produced the form called *rotundaria*, owing to the larvæ being starved; but Mr. Barrett said that it was always reared among *pusaria* from larvæ which could not be distinguished from those which produced typical *pusaria*.

Mr. C. Fenn exhibited *Acidalia immorata*, L., a short series taken this season in Sussex; *Melanippe galiata*, Hb., a long bred series of the spring form from Deal; *M. fluctuata*, L., a very small dwarf form, and *Cidaria truncata*, Hufn., a very long bred series with the three parent females, and with reference to this species said that all the ova were laid within a few days of each other, but there was an interval of seven weeks between the emergence of the first larva to the appearance of the last; a portion of one brood was now preparing to hibernate.

Some discussion took place as to the characteristic distinctions between this species and *C. immanata*, Haw., Mr. Tugwell saying that the angle of the central band was more sharply marked in *C. russata* than in *C. immanata*. Mr. Fenn did not consider this at all a distinctive character, and was of opinion that the only real character between the two was the line on the hind wings. Mr. C. G. Barrett added that this was not always apparent, but in *immanata* the more pyriform shape of the fore wings was tolerably constant.

Mr. T. R. Billups exhibited a specimen of *Deilephila capensis*, one of three which had been taken at sea, 472 miles from land, the nearest point being Gibraltar. Mr. C. G. Barrett said that the species was mainly South African, and was not uncommon in Cape Colony.

Mr. C. A. Briggs exhibited two curious forms of *Melitæa aurinia*, Rott.

Mr. Carrington exhibited *Ornithomyia avicularia*, L., the so-called "Grouse Fly," and remarked that this winged parasite was not confined to grouse, being found on partridges, woodpeckers, starlings, rooks, and many other birds.

Mr. H. Moore exhibited a series of both the red and blue

form of *Ædipoda fasciata*, Fisch., from Trocadero, near Cadiz. Mr. J. Jenner Weir remarked that this species, although very conspicuous on the wing, was very difficult to detect when at rest, owing to its resemblance to the soil.

Mr. Carrington said he had recently been staying at Skegness in Lincolnshire, a locality which had hitherto been but little worked; the weather was very unfavourable, and accordingly he had not seen much in the way of Lepidoptera; he had only noticed *Polyommatus phlæas*, L., and *Plusia gamma*, L., larvæ of *Spilosoma fuliginosa*, L., were common; also those of *Bombyx rubi*, L., and *Hadena pisi*, L. Notwithstanding this, he thought the locality in the summer months would be one well worth working; the sand-hills were thickly covered with vegetation, the bulk of which was grass; the sea buckthorn in many places grew very tall, *Elymus arenarius*, L., grew very abundantly on the north side of the town. Of shells he found *Helix nemoralis*, L., in very great number and in beautiful variety; one form of which, of a coffee colour, he was not familiar with. *Helix ericetorum*, Müll., occurred but sparingly. *H. virgata*, DaCos., commonly in two places, both of very small area. He had noticed fieldfares, plenty of swallows, and a few sand-martins. He had brought for Mr. Step a specimen of the natterjack toad (*Bufo calamitas*), a species which was more local than rare. Mr. Step exhibited the specimen referred to, and pointed out the differences between it and the common toad, and said that around London it seemed to have formerly occurred at Teddington, Blackheath, Putney, and Wimbledon.

Mr. E. Step reported that owing to the miserably wet weather, only Mr. C. Oldham and himself went to Ashted, Surrey, on the 19th instant, the date fixed for the Society's annual fungus gathering. The following species were noted: *Amanita muscaria*, L. (poisonous), *A. rubescens*, Pers. (edible), *A. vaginatus*, Bull. (edible), *A. adnatus*, Smith (uncommon), *A. mappa*, Fr. (poisonous), *Clitocybe laceatus*, Scop., *Collybia dryophilus*, Bull. (poisonous), *Clitopilus prunulus*, Scop. (edible), *Psaliota campestris*, Linn. (edible), *Stropharia æruginosus*, Curt., *Paxillus innolutus*, Fr. (edible), *Lactarius quietus*, Fr., *Russula adusta*, Fr., *R. heterophylla*, Fr. (edible), *R. emetica*, Fr., *R. ochroleuca*, Fr., *R. alutacea*, Fr. (edible), *Marasmius oreades*, Fr. (edible), *Boletus chrysenteron*, Fr. (edible), *B. scaber*, Fr. (edible), *Fistulina hepatica*, Fr. (edible).

OCTOBER 8th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. Walter Smith was elected a member.

Mr. Frohawk exhibited a series of the confluent form of *Lycæna icarus*, Rott., from two North Kent localities.

Mr. W. H. Tugwell exhibited examples of *Agrotis agathina*, Dup., and *A. strigula*, Thnb., southern and northern types. In both species the southern form being of a much redder tone than the northern. He also exhibited *Noctua castanea*, Esp., from Perthshire, and the var. *neglecta*, Hb., from the New Forest, Hants.

Mr. Tugwell exhibited, on behalf of Mr. Boden, a specimen of *Prodenia literalis*, Boisd., a species not found in Britain, and which was bred from a tomato by Mr. Boden. The pupa case was also shown.

Mr. South said the species was fairly common in India.

Mr. J. Jäger exhibited specimens of *Callimorpha hera*, L., and var. *lutescens*, L., bred from ova, the parent moth being taken in Devonshire; also *Agrotis ripæ*, Hb., bred from larvæ taken on the Essex coast.

Mr. W. West (Streatham) showed a variety of *Catocala nupta*, L., having the underwings shot with yellow.

Mr. A. Robinson exhibited a long series of *Nonagria cannae*, Och., taken by him and Mr. Bird in Norfolk, and called attention to two males and one female, which were extremely dark. Mr. C. G. Barrett remarked that the series was of a different range of colour from those he had previously seen in Norfolk.

Mr. H. J. Turner exhibited *Zygæna meliloti*, Esp., taken this year in the New Forest, and examples of *Limenitis sibylla*, L., and *L. camilla*, W.V. (Continental). Mr. C. Fenn stated with reference to *Zygæna meliloti*, Esp., that Mr. Fletcher had told him that under no circumstances would the species pair with *Z. trifolii*, although *trifolii* paired freely with *Z. loniceræ*.

Mr. R. Adkin exhibited *Sesia musciformis*, View., from the Isle of Man and Cornwall; all bred from sea thrift (*Armeria maritima*, Willd.). Those from the former locality appeared to be more robust and more densely clothed with scales than the Cornish specimens.

Mr. R. Adkin also exhibited a male and female specimens of a *Tortrix*, bred from larvæ feeding among the needles of a shoot of Scotch fir that he had received from Tuam, Co. Galway, and which had been described and figured from specimens reared in 1890, under the name of *Tortrix donelana*, by Mr. G. H. Carpenter (*Scien. Proc. R. Dublin Soc.*, vol. vii.,

pt. ii.), and read notes, in the course of which he mentioned that the imago appeared to bear a very strong resemblance to *T. viburnana*, Fb., and the larva was very similar to that of the same species.

Mr. C. G. Barrett also exhibited specimens of this *Tortrix* among various forms of *T. viburnana*, from which species he stated he was unable to distinguish it. *T. viburnana* larva fed on a variety of foodplants, and it was a very general feeder, yet it was an extraordinary thing to take it upon fir; the Irish specimens were certainly smaller than typical *viburnana*, and the reduction of size through the unusual foodplant of the larva was really the most important point. Mr. Tutt remarked that it was already recorded that *T. viburnana* did feed on pine; Herr Hoffman had sent him a series of *T. steineriana*, Hb., var. *dohrniana*, H.-S., and Mr. Tutt considered that the Irish specimens were referable to this variety of *steineriana*.

Mr. F. Frohawk exhibited an example of the Fork-tailed Petrel (*Procellaria leucorrhæa*, Vieillot), found dead September 27th, in Co. Clare, after a heavy north-westerly gale.

OCTOBER 22nd, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. Henry Mead Briggs was elected a member.

This was a Special Meeting, at which new Bye-Laws were submitted, proposed amendments considered and discussed, and in the result the Bye-Laws as amended were adopted.

NOVEMBER 12th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. Cooper exhibited a variety of *Abraxas grossulariata*, L., without any trace of yellow in the markings of the wings, and having a broad central black band.

Mr. Herbert Williams exhibited wine corks perforated by the larvæ of some insect; one of these larvæ was also exhibited. Mr. Williams stated that they were doing a considerable amount of damage to a city wine-merchant's stock; the corks of over 200 bottles of port (for which wine the species showed a decided preference) having been attacked. Mr. C. G. Barrett expressed an opinion that the larva was a half-grown specimen of *Ecophora pseudospretella*, Sta.; but it was very active, and might be the equally common *Endrosis fenestrella*, Scop. Mr. R. Adkin said he did not think either species confined their attention to port wine corks, nor did he think the larvæ ever went through the cork into the wine.

Mr. Carrington mentioned an instance of a large quantity of wine in Norway having been soured by the corks being perforated by the ravages of a larvæ.

Mr. Forrester exhibited *Bombyx quercus*, L., var. *callunæ*, Palmer, from Perth. Some observations were made as to the transformations being quite distinct, *quercus* passing the winter in the larval stage, while *callunæ* pupated in the autumn, and passed the winter in that condition. It was, however, pointed out that in some years larvæ of *quercus* fed up slowly, and pupated in the autumn. Many were reported as having been taken, full-fed, in the Warren at Folkestone during August and September.

Mr. Oldham exhibited among other species a black var. of *Cerastis spadicea*, Hb., from his garden near Epping Forest, and a specimen of *Apamea ophiogramma*, Esp., taken in the Forest.

Mr. Tugwell exhibited *Melanippe galiata*, Hb., from Huddersfield, and for comparison southern forms of the species, and remarked that the Yorkshire specimens were much darker than the southern type, the central fascia being almost black; also that the Huddersfield specimens were a trifle smaller than ours.

Mr. W. H. Tugwell also exhibited some parasitic fungi, and made the following remarks:—"The fungus shown is probably one of the Entomophthoræ,¹ a tribe of fungi parasitic on insects, one of which, *Empusa muscæ*, kills so many house flies in the autumn, the dead bodies of which are so frequently seen sticking to our window panes. The fungi in question appeared in a pupa cage, in which some 80 pupæ of *Scotosia certata* had buried themselves, apparently in the most healthy condition possible. The larvæ had been fed up on their natural foodplant, *Berberis vulgaris*, and not a single death had occurred in the brood from the egg to pupation; but about a month after this a most suspicious-looking fungoid growth appeared, pushing up through the soil in all directions, shooting up in white twig-like points half an inch or more high. On carefully removing the soil it was at once evident that each little patch of fungus sprang from the killed pupa of *certata*; in fact, every one of the 80 had succumbed to its deadly action. The pupæ that had first fallen victims to this fungoid parasite were entirely enveloped in it, so that it was only by breaking them in half that the host was seen to be the killed *certata*. Other of the pupæ, later victims of

¹ A fungus, too, produces on silkworms a disease called muscadine, and causes a great loss to silk growers.—W. H. T.

the destroyer, looked apparently healthy ; but a close inspection showed that in the divisional segments of the pupal body, just traces, more or less, of white thread-like spots could be seen, and the pupa was stiff and could be snapped asunder like a damp rotten stick, quite solid-looking, and filled up in centre, from which you could readily cut transverse or longitudinal sections for microscopic investigation. When these segments were examined under a fairly high power, one-eighth of an inch, all trace of healthy pupal growth appeared lost and entirely changed in character. The mycelium of the fungus, which had destroyed the vitality of the pupa, had, too, entirely altered its appearance. At first I thought that the fungus might have been introduced into the larvæ by their food, but further experience tends to prove, rather that the sporangia of the fungus were in the soil, and only awaited a fitting host to germinate, which was found in the *certata* pupa. I afterwards placed some pupæ of *Gortyna ochracea*, Hb. (*flavago*, Esp.), that I had collected from burdock stems in quite another district on some of the same soil that *certata* had been in. Those pupæ of *flavago* that were near emerging came out unaffected, but all the later specimens were killed by the fungus ; thus pretty well showing that the fungus must have been introduced by the soil. A thought occurred to me as to whether these spores, which could be cultivated or propagated in any quantity, might not be used to destroy noxious and injurious larvæ ? There is little doubt but that the fungus would destroy any quantity."

Mr. C. G. Barrett exhibited a variety of *Argynnis aglaia*, L., taken in Norfolk by Dr. Wheeler ; two specimens of *Lycæna argiades*, Pall., taken on Bloxworth Heath in 1885, by Mr. C. O. Pickard-Cambridge and Mr. A. Pickard-Cambridge ; and blackish specimens of *Aplecta nebulosa*, Hufn., reared by Mr. Collins of Warrington, from larvæ collected in Delamere Forest, and named by him var. *Robsoni*.

Mr. R. Adkin again exhibited the specimens of the *Tortrix* which Mr. Carpenter had named *donelana*, and remarked that it had been stated in a report of a previous meeting that he had exhibited these specimens as *Tortrix steineriana* var. *dohrniana* ; he had, however, when exhibiting them, said he considered them to be *Tortrix viburnana*. He also now exhibited a specimen of the variety *dohrniana* from Dr. Staudinger.

Mr. C. G. Barrett exhibited examples of *Tortrix steineriana*, and examples of *T. viburnana* and its varieties, and stated that he had been in correspondence with Mr. Carpenter on this

subject, and was still of opinion that the specimens were simply *T. viburnana*. Mr. Carpenter had written him that although the larvæ fed on pine, one example had fed equally well on *Vaccinium*.

Mr. Tutt exhibited the series of *Tortrix steineriana* var. *dohrniana*, sent him by Herr Hoffman, and stated that the male showed the usual unicolorous character of the male of this particular group, the females being very concave on the costa, and varying from almost unicolorous to a well-developed central band. He also exhibited specimens of *T. viburnana*, from Darlington and Armagh, both sexes of *T. paleana*, Hb., specimens of the marsh species, which he said was probably the *asphodilana* of Herrich-Schäffer, and supposed to be synonymous with *unicolorana*, Dup., from the Essex marshes. Mr. Tutt remarked that in this part of the genus there were some six or eight species very closely allied, and it was difficult to separate these after studying the variation among them, and he added that the figure published by Mr. Carpenter was undoubtedly that of *steineriana*. He did not suggest that Mr. Barrett was not right in calling the Irish specimens *viburnana*; but until more material was obtained, he did not think it could be assumed they were distinct from the Continental *T. steineriana* var. *dohrniana*.

Mr. Barrett remarked that Mr. Carpenter's figure was from a single specimen, and was extremely unlike the majority which had since been bred.

NOVEMBER 26th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. J. A. Cooper exhibited five specimens of *Arctia caia*, L., the red colour in the inferior wings being replaced by yellow. Mr. Cooper remarked that from some thousand larvæ collected near Wanstead Flats, Essex, seven of this form of the insect were bred, the whole of them emerging in one day; the larvæ were fed under usual conditions, and as far as he could say there were no atmospheric conditions which would account for the variation.

Mr. Tugwell called attention to one of the specimens having the fringe of the inferior wings almost entirely black; he had lately looked over about one hundred specimens, and only found one with a black fringe.

Mr. Carrington said he, in company with Mr. Briggs, recently when going through the late Mr. Bond's collection, noticed that in the series of about forty *caia*, there were only six with dark one with buff, and the rest with light antennæ;

the darkest specimen had light, and the lightest specimen dark antennæ.

Mr. Tutt mentioned that Mr. Ovington had once reared seventy *caia*, two of which were nearly black, five yellow, some remarkably pale, and others showing perfect gradation in colour from light to dark.

Mr. R. Adkin exhibited a specimen of *Sesia scoliceformis*, Bork., being one of two bred during the past summer from larvæ taken at Rannoch. He said that although the imago appeared to be exceedingly rare, it could hardly be said that the larvæ were so, a fair number having been found; but they were invariably feeding in the hard stems of the birch trees, and as a consequence it was a difficult matter to remove them without injury; in addition to which they appeared to be unusually liable to the attacks of ichneumons, many more of the latter being bred than of the moth. Like others of the Sesiidæ, they pass two or more years in the larval state.

Mr. Tugwell expressed an opinion that the specimen was smaller than those obtained from Llangollen; he also thought that the male could be got by "assembling," a method of collecting the Sesiidæ which he knew to work well with *S. sphegiformis*, Fb., and *S. culiciformis*, L.

Mr. Carrington said that Mr. Nicholas Cooke was the first to notice that the holes in the birch trees were caused by this species; he had been at Rannoch when Mr. Cooke's son was taking the species. It was necessary to get on to the ground before daylight, and then watch the trees most carefully to see the moth emerge; if it was not boxed before the wings were dry it would fly away. It was an excessively laborious business, as the species occurred at the very height of the season when sugaring was exceedingly late, and the only collecting time was the short period while the moths were drying their wings.

Mr. Adkin, in reply to Mr. C. G. Barrett, said that the larva was not in the solid wood, but in the thick bark of old trees at some three or four feet from the ground.

Mr. R. Adkin also exhibited a specimen of *Euchlœa cardamines*, L. ♀, taken near Hayward's Heath, Sussex, having a distinct black V-shaped mark on the disc of the wing, below the discoidal spot, on the underside of the primaries.

Mr. C. G. Barrett remarked that this form of variation was very interesting, as it occurred in various species; in the species of *Oporabia* it was of frequent occurrence, and in *Setina irrorella*, Clerck, an IVI-variety was occasionally met with. The V mark was usually caused by the suffusion of black scales on the fork of the median nervure.

Mr. C. Fenn said that in the genus *Oporabia* it was well known to arise in this way, but in this specimen of *cardamines* the union of the black scales which formed the V mark was not on the divisions of the nervure.

Mr. Short exhibited an extremely light example of *Acronycta psi*, L., some dark forms of *Spilosoma lubricipeda*, Esp., from North London, and varieties of *Melanippe fluctuata*, L.

Mr. Hawes exhibited a living specimen of *Polyommatus phlæas*, L., and said that the larva hatched from the egg on August 28th, pupated October 2nd, and the imago emerged on the 25th inst., the pupa having been kept in a high temperature.

Mr. Hawes stated that he had been endeavouring to get various species of butterflies to deposit ova by lamplight, and had been successful with *Pararge megæra*, L., and *Pieris napi*, L., one female of the latter laying very freely, depositing twelve eggs in a few minutes.

Mr. S. Edwards exhibited *Papilio khasia*, a var. of *P. arguna* from Java; *P. agetes* from India; *P. laodomas* from Brazil; also a saw-fly from Oxted, caught in June last, named *Abia fasciata*, a ♀, and remarked that Von Siebold only bred 5 or 6 males to hundreds of females, from parthenogenetic eggs; and Dr. Osborne, out of 282 cocoons, obtained 172 females and 1 male, 28 being ichneumonated.

Mr. R. South exhibited a series of *Liparis monacha* var. *eremita*, Och., bred from French larvæ, and said it would be particularly interesting to ascertain the origin of this particular form, whether it occurred in the New Forest or any part of England; he had never seen it in the New Forest himself, but understood it occurred there.

Mr. C. G. Barrett remarked that he did not think this particular suffused form was obtained in the New Forest, but collectors found it in the Midlands.

Mr. Tutt said Miss Kimber had bred an exceedingly dark one from a larva taken in the New Forest, and Mr. Dobson had told him that he once bred a number of banded ones from larvæ taken in the New Forest.

Mr. Tugwell thought that in Mr. South's specimens it was a darkening of the ground colour, whereas in a very dark specimen he had bred from a larva taken at West Wickham, the darkness seemed to arise from a thickening of the black markings.

Among the presentations to the Library was a copy of "The Annual Report of the Fruit Growers' Association, Ontario, for 1890." Mr. Billups stated that on looking at this

he found that the ichneumon bred by him from the cocoon of *Attacus cecropia* was *Cryptus extrematis*, Tasch., a species which the Report stated was bred from *Telea polyphemus*.

Mr. C. A. Briggs exhibited a fungus which Mr. Step said was *Agaricus personatus*, Fries, a species he used to take at Putney, Surrey, and which was very delicious when cooked.

Mr. R. Adkin exhibited a small collection of Lepidoptera from Eastbourne, Sussex, and read notes, which are printed in full at the end of the Abstract of Proceedings.

Mr. Carrington remarked on the general abundance of *Pieris napi*. Mr. Hawes also spoke as to this, and said with reference to Mr. Adkin's notes on *Lycæna corydon* getting down among the roots of the grass, he had himself noticed it more especially with the *Hesperidæ*, he had by looking among the roots seen hundreds of *Hesperia actæon*, Rott., within a very small area. He also concurred with Mr. Adkin as to the *Vanessidæ*, with the exception of *V. urtica*, being extremely scarce. Mr. Tugwell said that it was extremely difficult on a wet day to find the imagines of *Melitæa athalia*, Rott., while on the other hand if the sun was shining it was abundant. Mr. Carrington differed from Mr. Tugwell, as in his experience this species was easily found at rest. Mr. South stated this applied also to *M. cinxia*, L.

Mr. Carrington asked whether there was any information as to the reported capture of *Polyommatus virgaureæ*, L., at Birling Gap, near Seaford, and Mr. Tutt said in reply that he had seen the specimen, which had been taken by quite a beginner, and it was apparently authentic.

DECEMBER 10th, 1891.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. C. G. Barrett, on behalf of Mr. Russ, exhibited the following species from the West of Ireland: a very large female *Pieris brassicæ*, L.; males, without any spots, of *P. rapæ*, L.; *P. napi*, L., varieties of the female with the wing nervures broadly dusted with black dots to the tips and approaching var. *bryoniæ*, Och.; varieties of *Satyrus semele*, L., and *Euchlœ cardamines*, L.; fine female varieties of *Lycæna icarus*, L., and males of the same species with the hind margin black spotted; dark and pale forms of *Odontoptera bidentata*, Clerck, *Cidaria immanata*, Haw., *Melanippe fluctuata*, L., *Agrotis cursoria*, Bork., *A. vestigialis*, Hufn., and *A. tritici*, L., *Hydræcia micacea*, Esp., and *H. nictitans*, Bork., *Luperina testacea*, Hb.,

Hadena protea, Bork., *Epunda lutulenta*, Bork., a pretty banded form of *Cidaria testata*, L., a beautiful clouded form of *C. pyraliata*, Fb., *Polia chi*, L., var. *olivacea*, St., *Apamea didyma*, Esp. of the colour of *Miana literosa*, Haw., and curious *Camptogramma bilineata*, L.

Mr. Barrett, referring to his exhibit, said it was extremely interesting that both light and dark forms of so many species should occur in one locality; climate was now considered to have much to do with producing variation in colour, and it did not appear that the effect was always in the same direction. In some the modification would be to darken, in others to make paler, and in some both ways. In the West of Ireland the climate was an exceedingly wet and stormy one, and such as was expected to produce dark colouring, yet both pale and dark forms occurred there year after year.

Mr. South said that the form of *Lycæna icarus*, with black spots on the hind margin, occurred in the Isle of Wight, and he had received it from Perthshire.

Mr. Fenn, referring to the occurrence of pale and dark forms together, said in his opinion it did not amount to much, as in variable species it was usual to take both pale and light forms wherever collecting, and he gave as instances *C. immanata* and *A. cursoria*.

Mr. Tutt said this was well known to all Lepidopterists, but there was generally a particular characteristic for every particular locality: the palest and whitest examples of *A. tritici* occurred at Deal; at the same time some were almost black, yet there was a general tendency to a bluish tinge; Mr. Russ's specimens showed a tendency towards brown, although there were extremely dark and pale specimens among them. *Xylophasia monoglypha*, Hufn., in Ireland and Scotland had a tendency to become very dark, but pale forms did occur. *Tæniocampa incerta*, Hufn., from Forres, was of a reddish colour, but in other localities there were black and grey ones. *Noctua castanea*, Esp., and its variety *neglecta*, Hb., was another case in point.

Mr. Jenner Weir, referring to the specimens of *P. napi*, said he had received examples from Cavan half-way between the ordinary form and the variety *bryoniæ*.

Mr. Barrett remarked that in South Wales the spring emergence generally produced the darkest specimens; some five or six years ago, however, he happened to be at Belfast in August, and then took a series of the autumnal emergence, very large and dark specimens. Desiring to obtain specimens of the spring brood from the same locality, he got a friend to

take him a long series the following spring, but they were all of the most ordinary form, just as found in England.

Mr. R. Adkin exhibited a specimen of *Pieris napi*, L., ♀, which he said came nearer to a variety that he had been looking for for a long time, than any that he had previously seen, namely, one in which the apical patch and the two spots on the fore wings coalesced so as to form an irregular submarginal band. In the specimen exhibited the band was almost complete, being interrupted only by a clear white line of less than a hair's breadth between the two spots. The specimen was taken near the Essex coast during the past summer. He further said that the nearest approach to the form mentioned that he had previously seen was one of a series from the North of Ireland, in which, although the spots were almost as nearly united as in the Essex specimen, the separation between them and the apical patch was very distinct.

Mr. Tugwell exhibited a box of Lepidoptera received from Mr. W. Reid, of Pitcaple, and remarked that there was nothing of any importance among them; he commented on the poor success Mr. Reid had met with; he had heard, however, that he had taken *Retinia duplana*, Hb., a few *Crambus myellus*, *Stigmonota dorsana*, and a species of the *Pterophorina* which he could not identify, the larvæ of which fed on the underside of the leaves of ragwort.

Mr. C. G. Barrett said the first reputed specimens of *R. duplana* were not this species at all, but were referable to *turionana*; it was subsequently suggested that *duplana* occurred earlier in the year, and since then Mr. Salvage and Mr. Reid had both obtained it.

Mr. S. Edwards exhibited a pair of *Ornithoptera brookiana* from Borneo, the ♀ being much rarer than ♂. It is only within the last two years that the ♀ has become commoner—Distant, in his book, says about 1,000 ♂ to only 15 ♀—also ♂ *Papilio nox* from Borneo, rather rare, *P. ulopus* from Mexico, *P. lankeswara* from Malay Archipelago, and *P. pandion* var. of *pompeius* from Mexico; also *Kallima buxtoni* from Sumatra, one of the dead-leaf mimicking species.

Mr. J. Jenner Weir remarked that *Ornithoptera brookiana*, until lately, had alone represented a section of the genus, but that recently an allied species had been discovered in Palawan, thus affording a further contribution to the probability that the fauna and flora of that island would prove to be more Bornean than Philippine.

The Secretary read the following letter from Mr. Mans-

bridge :—" It may be remembered that at the Society's meeting of March 13th, 1890, I exhibited larvæ and imagines of a species of *Tinea* feeding in fish guano, from Brettesnoes on the north-west coast of Norway. At that meeting, and subsequently, Mr. Tutt expressed the opinion that it was *Tineola biselliella*, Hml., but other gentlemen differed; grounding their decision chiefly on the large size of the specimens. I did not take *biselliella* last year; but this spring I have taken a few specimens, both at Leeds and York, which did not differ in any way from the insects bred from the guano, being quite as large. I believe, therefore, I am right in concluding that the insects bred from the fish 'guano are *T. biselliella*; unfortunately, however, the specimens from York and Leeds have been accidentally destroyed, so that I am unable to forward them."



Notes on the Genus *Triphæna*, Och.

By R. ADKIN, ESQ. Read February 26th, 1891.

Of the numerous genera comprised in the British Noctuæ perhaps none is more familiar to us than *Triphæna*. The wide geographical distribution of the six species contained in it, their bright appearance, lively habits, and proneness to aberration, rendering them particularly attractive even to the most casual observer. The generic limit, moreover, appears to be a very natural one, the species bearing a strong superficial resemblance to each other, both in the larval and perfect stages; in the former their habits are also much alike, and in the latter by no means dissimilar.

It is true that many Continental authors ignore this generic limitation, and prefer to include the six species in Ochsenheimer's greater, and, to my thinking, unwieldy, genus *Agrotis*, and possibly other species occurring on the Continent, but which are unknown to our fauna, may render its boundaries less clearly defined, but for our present purposes the limit appears to be a convenient one.

Having thus glanced at the genus as a whole I propose to confine my attention to the individual species, and here I am met by a difficulty, which, in order to make myself more clearly understood hereafter, I will deal with at once. I refer to the nomenclature applied to two of the species. Unfortunately the authors described these under one and the same name, *orbona*. Now if we are to understand one another it is necessary that we should decide to which of the two this name should apply. Hufnagel, in 1767, described what we know as the rarer of the two species under the name of *orbona*, and Hubner, in 1776, figured it under the name of *subsequa*. In 1787, Fabricius described our commoner species under the name of *orbona*, and subsequently (1793-1827), Hubner applied the name of *comes* to it. From this we see that Hufnagel being the first to use the name of *orbona* has the prior claim to it, and he applied it to our rarer species. The same name cannot be used for two species in one genus, therefore Fabricius's *orbona* must sink, and Hubner's more recent name of *comes* stand for our commoner species. I hope I have made myself understood on this point, and, fortunately, the names of the other species in the genus are too generally accepted to need any remark.

Of the six species inhabiting Britain five are of general distribution, while of one the range appears to be somewhat

restricted ; five may be regarded as common insects ; and all are liable to aberration in a greater or less degree, but in one only do we find great local variation.

I am not aware of any sufficient reason for following a particular sequence, and therefore will commence with

Triphæna fimbria, L. This is the largest and most handsome species in the genus. It affords a striking example of colour variation, the extremes being a pale wainscot-brown and a dark olivaceous-brown, while intermediates occur of varying shades between the two. It is also liable to a certain amount of variation in the markings of the primaries, the outer line of the central band being acutely angled in some specimens, while in others it is rounded, and the dark spot near the apex is sometimes strongly produced, but occasionally almost wanting. There does not appear to be any relation between the variation in colour markings, nor has locality any great effect upon either ; thus we find the light and dark forms among both southern and northern specimens. It has been met with throughout the greater part of the British Islands, as far north as Elgin, from which locality are two of the specimens exhibited, these favour the intermediate rather than the extreme forms ; as do also two from North Wales. Its Continental range extends from Asia Minor and the southern countries of Europe to South Scandinavia.

Triphæna pronuba, L., is generally regarded as the commonest species of the group, and is of general distribution throughout the whole of the British Islands ; indeed, it has the largest geographical range of any species of the genus, extending over almost the whole of the European district except the Polar regions. It is liable to very great variation, but locality appears to have no effect upon it in this respect. We find the handsomely mottled type sitting on the sugared trees in our Kentish woods, side by side with the plain unicolorous *innuba* forms, and in the north of Scotland a similar range of variation exists. The exhibit comprises series from Kent and Forres, two specimens from North Wales, and sundry German types for comparison, these represent but a few of the forms that occur in any one of the localities, but it will be seen how closely the various forms from the one and the other match each other.

Triphæna ianthina, Esp., is one of the most constant species of the group, the chief variation being a slight difference in the depth of coloration, this is most marked in some of the Scotch specimens, which are somewhat lighter and redder than those from the more southern districts ; but even here

the difference is by no means striking, and probably is the result of accident in the particular specimens selected, rather than a general character of the district. This species also is of very general distribution throughout Britain, but its Continental range appears to be confined chiefly to the southern and central districts.

Triphæna interjecta, Hb., is another comparatively constant species, showing but little variation beyond a slight difference in the tone of colour of some specimens. It appears to have a somewhat restricted range in our islands, being confined to the southern portions, and on the Continent has a much less general distribution than the other members of the genus.

Triphæna orbona, Hufn. (= *subsequa*, Hb.), owing to its comparative rarity, offers a less favourable opportunity of judging of its liability to variation than is afforded by its commoner brethren, but it has been taken in sufficient numbers in Scotland during the last year or two to enable us to form some idea on the subject; and here again we find it to be a matter of tone of colour, but in a somewhat more marked degree than in the two last mentioned species, some few of those recently taken at Forres showing a decided tendency towards melanism, but excepting in this one point, there appears to be no great difference between these and the more southern examples. It has been taken in most of our southern counties, at one time somewhat commonly in the New Forest, and as far north as Shetland, it is also reported from Ireland. On the Continent it has a wide range, extending northward into Scandinavia.

Triphæna comes, Hb., is the last species that we have to deal with, and it is, I think, by far the most interesting. Not only is it liable to great variation in both colour and markings, but gives some extreme local forms, and in this respect differs from the other five members of the genus. The series now exhibited is perhaps a sufficiently representative one to give an idea of the various forms that it takes, and before examining them in detail it may be well to glance at its geographical distribution. This, as compared with most of the other members of the group appears to be more southerly, thus we find that it occurs in the Canaries, North-West Africa, Southern and Central Europe. In Great Britain it is an abundant species throughout the country, as far north as the Orkney Isles, but does not appear to have been recorded from the Shetlands.

In dealing with the various forms that occur it may be well

to commence with those from the southerly districts, and for this purpose, and for comparison with our British forms, I have brought representatives from Asia Minor, Dalmatia, and Saxony; these all belong to what I may call the clay-coloured class, deepening in some specimens to a greyish-brown, and in others to a somewhat reddish tint, but not showing any very decided variation in this respect. I have not been able to obtain examples from more northern Continental localities, but by the courtesy of Dr. O. Staudinger I learn that nothing is known of anything nearly so dark as var. *curtisii* (a form to which I shall hereafter refer) but that rose-red, *not brown-red*, specimens have been taken in Denmark.

The prevailing form in the South English counties appears to be of the clay-coloured type, varying in tint, and including greyish-brown, and occasionally reddish examples. In the midland counties and North Wales there is a tendency to run into more decided and darker greys, and a dark central shade that is ill-defined in some of the southern specimens, becomes somewhat pronounced in some of these. The Isle of Man type is even paler than the South English, some examples being quite of a pale pinkish-gray shade. From the North of Ireland we begin to find decided, though not dark, red forms, but the dark greys are absent.

At what particular latitude the dark red *curtisii* forms commence to appear I am unable to say, it does not appear to be known in the Paisley district,¹ and specimens that I have seen from that neighbourhood more nearly resemble those from the Isle of Man than any of the darker forms, but it may be remembered that Curtis's typical specimen was taken in the Isle of Bute, which is only some twenty-five miles due west of Paisley. This is the most southerly locality I have for it, the large numbers that have been captured and bred of late years coming chiefly from Aberdeenshire, Elgin, and the Hebrides, it has also been taken in Orkney. It must not be supposed that only this form occurs in these districts, on the contrary the range of variation is exceedingly great, and includes some of the palest and plainest, as well as the darkest shades known to the species, some of these latter being almost black.

But for all this each of the districts appear to have a tendency to a particular class of variation, thus the majority of the specimens from the Isle of Lewis (Hebrides), whether light or dark forms, have strongly produced markings, the

¹ Since writing the above I learn that some specimens closely resembling the var. *curtisii* have been taken at "sugar" at Paisley.

stigmata and striæ being in contrast with the ground of the wings, and thus producing a bright appearance. Those from Forres (Elgin) are generally less acutely marked, giving a duller appearance, while those from Aberdeen more nearly resemble the Lewis forms recently exhibited. But in spite of their comparatively dull appearance these Forres series show a greater range of colour-variation than any of the others that we have noted, nor are they deficient in variety of marking; not that any of the usual markings are absolutely wanting in any of the specimens, but they are subject to modifications, which in combination with varying shades of colour give the insects very divergent appearances. Thus in the series captured in 1888 is one example in which the ground colour of the primaries is a dull reddish-grey, the usual transverse lines are indicated by minute black dots, the submarginal band is hardly darker than the ground colour, as are also the stigmata which are faintly outlined in whitish; the central spot of secondaries is unusually narrow and ill-defined, the band also is less distinctly black than is usual, and is intersected by the first median nervule. This last appears to be a not uncommon phase of variation, and is noticeable in some specimens in almost all the series exhibited; it may be remembered that our attention was called to it at one of our former meetings by Mr. South (*Proc.* 1888-9, p. 158). In the series bred in 1890 are some greyish-pink and grey specimens in which the stigmata and submarginal line are but little darker than the ground colours, in some of these the central spot in the secondaries is divided, and the band narrow and much serrated. In some of these same specimens the lower half of the reniform stigma is filled up with very dark colour, while the upper half is pale, thus giving the appearance of a central spot. Other grey and brown-grey examples have both the reniform and orbicular stigmata completely filled with a distinctly darker shade, and the submarginal line also in strong contrast with the ground of the wing, in many of these the transverse lines form distinct white dashes on the costa, and the secondaries have both the spot and band black and well developed.

In the same set is another and darker brownish-grey form, in which the stigmata are not in strong contrast, the shade of the ground colour, however, varies considerably, in some individuals approaching a blackish-brown, and the colour of the secondaries inclines towards a rich bronze. The whole series bred from ova in 1888 were of a brickdust red colour, with the usual markings distinctly produced, their chief

peculiarity being in the band of the secondaries, which is intersected on the outer margin, and forms a row of marginal crescents; a similar state of things may also be observed in individuals in some of the other series.

Among those captured, or bred from wild larvæ, in 1890, are some other very red examples, and from these forms we can clearly trace the extreme aberration known as *curtisii*. Commencing with a lightish red insect with stigmata merely indicated by a pale outline, we pass through deepening shades of red, the inner margin also becomes proportionately darker, and the secondaries are suffused with black scales, until we arrive at a form in which the costal part of the primaries is claret-red, the inner margin almost black, and the stigmata large and distinctly outlined, the secondaries having the band broad, extending along the costal margin and uniting with the central spot, and the median area suffused with black scales, a description which appears to agree with that of var. *curtisii*. Some of these Forres examples go even beyond this in having the whole ground of the primaries almost black.

I fear I have already taxed your patience somewhat severely, but I trust that I may be permitted to call attention to one or two of the more striking varieties that have not yet been noticed..

In the last row of the Lewis series—the last one—the orbicular stigma is distorted, being elongated and the top flattened, this brings the upper and lower outlines so close together that it has the appearance of an irregular yellow spot; an elongation of the reniform is not unusual in the Lewis form, or indeed in the species generally, but I have not previously noticed such an extreme case.

In the series captured at Forres, 1888, the seventh specimen from the top has the primaries of a brickdust red and the stigmata small, almost black, and united by a blackish shade.

The last of the same series has the primaries glossy black, but the band of the secondaries is attenuated posteriorly, much serrated on the inner margin, intersected by the first median nervule and not connected with the spot, which is unusually narrow, a very "*multum in parvo*" of minor varieties of markings in conjunction with an extreme colour variation.

Although I have dwelt chiefly upon the northern forms in dealing with the various phases of variation, it must not be supposed that interesting varieties do not occur in districts more easy of access to the majority of us, and I have little

doubt that if some of our members will devote their attention to rearing this species from South English larvæ on as large a scale as it has been reared from Scotch, they will find that they have not wasted their time, and will no doubt throw fresh light upon what should be, but what probably are not, the best known forms occurring in this country.

In conclusion I append the following note:—

Hubner's figure of *comes*, which stands as our type, is a lightish reddish-brown insect, with the stigmata and submarginal line distinctly darker; many of the lighter of the Forres specimens agree very closely with it.

In addition to this we have three named forms: Treitschke's *adsequa*, paler and unicolorous, a description that applied well to many of the palest of the Forres insects. *Prosequa* of the same author, which is described as darker and distinctly variegated, and is generally considered to be a reddish mottled form. I am not able to satisfy myself that any of the Forres specimens that I have seen agree very well with this description, which would appear to imply something between Hubner's *comes* and the var. *curtisii* of Newman, but more mottled, and of which representatives will be found among the Aberdeen and Hebrides specimens. And then there is the before mentioned *curtisii* of Newman, the chief characters of which are the deep red (claret coloured) costal portion and darker, sometimes almost black, inner margin of the primaries, with the stigmata outlined in yellow, and the deep border of the secondaries joining the central lunule and the suffusion of their central area with black scales.

In addition to these recognized aberrations of this species, Hubner figures an insect under the name of *consequa*, which is generally considered to be a synonym of Hufnagel's *orbona* (= *subsequa*, Hb.). It is a slate-coloured insect with the stigmata slightly darker than the ground, and the transverse lines of the median area light, particularly on the costa, the submarginal line complete and similar in colour to the stigmata, and compares well with the slatey form from Forres, and, so far as comparison of a figure with specimens can be taken as a guide to identity, certainly appears to represent a form of this species rather than of *orbona*, Hufn. This form is certainly not uncommon among the Forres series; not only have I found it in each of the sets that I have had from that district, but Mr. J. A. Clark bred it from ova in 1888, and has figured it in the plate of *comes* varieties published in the *Entomologist* with his notes on the species (*Entom.* xxii. 145).

He there classes it with what appears from the figure and description to be one of the darkest of the *curtisii* form; in this I can hardly agree with him. It appears to me that we have two distinct forms of almost black varieties, the one traceable downwards through varying shades of greys to a very pale grey type, the other similarly through the reds to a light red type.

Altogether this species offers a very good example of the difficulties attending any attempt to supply varietal names to the forms of a species known to be liable to great variation. It must be remembered that Treitschke's, and indeed Newman's names, which we now know to represent but forms, were, when given, believed, in all good faith, to be applied to distinct species; but if we, knowing the forms that we are dealing with to be but forms, attempt to designate each by a descriptive name our work must be endless. I have not a word to say against the trinomial system when used to designate a distinct and constant aberration, but when it is attempted to apply it to every individual showing a slight variation from what we regard as the type, the whole thing becomes ridiculous, and a stumbling-block to those who are to follow us.



**Notes on the Hymenopterous and Dipterous Parasites,
bred by Members of the South London Entomological
and Natural History Society during the years 1889
and 1890.**

By T. R. BILLUPS, ESQ. *Read March 12th, 1891.*

This paper is an addition to the one I had the honour of reading before the Society in December of 1888, in which I purpose continuing the List of Parasites reared by our members. It is necessarily very incomplete, owing, I fear in a great measure, to the apathy or, perhaps I ought to say, irritation of my Lepidopterist friends leading them to destroy so many of these little creatures which perhaps have caused sad havoc amongst the larvæ from which they had hoped to produce choice specimens. My best thanks are, however, due to the 22 gentlemen who have so liberally responded to my appeal made in 1888 to preserve the parasites that might come under their observation from time to time, thus enabling me to add to our original list some 95 species of Ichneumonidæ, and several species of Chalcids.

didæ, Diptera, etc. I have arranged them in accordance with the Rev. T. A. Marshall's Catalogue, published by the Entomological Society of London, 1872; the Braconidæ, by the Monograph published in 1885, and being now continued.

Ichneumon fabricator, Fab., three males of this species were bred by Mr. Adkin from larvæ of *Retinia pinicolana*, Dbl. *Ichneumon haglundii*, Holmgr., a male and female, bred by Mr. Barker, from *Spilosoma fuliginosa*, L. *Amblyteles castigator*, Fab., a male and female of this handsome species bred from *Hadena oleracea*, L., by Mr. Barker, a solitary male of *Amblyteles oratorius*, being bred from a larva of *Saturnia pavonia*, L., by the same gentleman. *Platylabus pedatorius*, Fab., was bred from larvæ of *Thera firmata*, Hb., by Mr. Barker, males only, while Mr. Adkin reared both sexes from *Heterogenea limacodes*, Hufn.; *Phæogenes stimulator*, Wesm., a single male, and *Phæogenes calopus*, Wesm., both sexes were bred from larvæ of *Ellopia prosapiaria*, L. A male and female of *Nematopodius formosus*, Gr., was bred from larvæ of *Pædisca solandriana*, L., from Aberdeen, by Mr. Adkin. *Hemiteles fulvipes*, Gr., was bred in some numbers from a spider's nest attached to a thistle found at Leigh, Essex, by Mr. Adkin, also from *Zygæna filipendulæ*, L., by myself, while *Hemiteles melanarius*, Gr., was bred from the larva of *Argynnis paphia*, L., both sexes, but I have unfortunately forgotten the name of the generous donor. *Orthopelina luteolator*, Gr., both sexes in some numbers of this species were bred by myself from larvæ of *Rhodites rosæ*, L., the maker of the well-known Bedeguar or Robin's pin-cushion gall, which occurs on the wild rose, also a number of the very beautiful Chalcid, *Callimome bedeguaris*, L. Amongst the Ophionidæ we have had several good species bred, such as *Enicospilus ramidulus*, Gr., a single female of which was bred by Mr. South from larvæ of *Toxocampa craccæ*, Fb.; while from those of *Hadena pisi*, L., Mr. Lowry obtained eight specimens of *Enicospilus repentinus*, Holmgr., both sexes. *Ophion luteum*, L., was bred by Mr. Henderson from larvæ of *Acronycta aceris*, L., females only, Mr. Barker finding the same species a fresh host in *Dianthæcia capsicola*, Dup.; to the last-named gentleman has fallen the honour of breeding the rarest of our Ophionidæ in *Ophion minutum*, Kriech., a solitary female of which he reared from the larva of *Pygæra pigra*, Hufn. *Anomalon cylindricum*, Bridg., a fine female of this species was bred by Mr. Adkin from *Chærocampa porcellus*, L.; this species has hitherto only been recorded from two specimens in

Mr. Fitch's collection, one being bred from *Euchelia jacobææ*, L.; another equally rare species, *Anomalon procerum*, Bridg., has been bred from the same host by Mr. Barker, this being also a female. A single female of the genus *Anomalon*, at present undetermined, was also bred by Mr. Adkin from *Tortrix piceana*, L. *Agrypon flaveolatum*, Gr., both sexes of this species were bred from larvæ of *Bryophila perla*, Fb., by Mr. South; while both sexes of *Agrypon canaliculatum*, Ratz., have been bred by the same gentleman from *Thera variata*, Schiff., Mr. Adkin also finding it a host in *Peronia hastiana*, L., from the Isle of Man. To Mr. Elisha am I indebted for 4 specimens of the rare *Trichomma enecator*, Rossi, two males and two females of which he bred from larvæ of *Phlæodes tetraquetra*, Haw.; a male of *Paniscus cephalotes*, Holmgr., was reared from the larva of *Pygæra curtula*, L., while both sexes were bred from *Dianthæcia capsicola*, by Mr. Barker; this gentleman also bred *Paniscus testaceus*, Gr., from the same host, Mr. Waller rearing no less than five specimens of the same species, two males and three females from a single pupa of *Dicranura vinula*, L. A male and female of *Sagarites latrator*, Gr., were bred by Mr. Adkin from larvæ of *Emmelesia albulata*, Schiff., from Shetland. *Casinaria tenuiventris*, Gr., was bred in some numbers by Mr. Barker, from *Ellopiæ prosapiaria*, L., both sexes being represented; Mr. South rearing two females of *Casinaria mesozosta*, Gr., from *Bryophila perla*, L.; both sexes of *Limneria majalis*, Gr., were bred by Mr. Elisha from the larvæ of *Laverna epilobiella*, Schr.; two males and one female of *Limneria parvulus*, Gr., were bred by Mr. Adkin from *Melitæa aurinia*, Rott., the same gentleman rearing three females and one male of *Limneria tumidula*, Gr., from *Retinia buoliana*, Schiff. Two males of *Limneria albipalpis*, Gr., were bred from *Ellopiæ prosapiaria*, L., by Mr. Elisha, and one male of *Limneria femoralis*, Gr., from the larva of *Coleophora solitariella*, Zell.; two males and one female of *Limneria armilata*, Gr., were bred by Mr. Adkin from larvæ in sallow shoots from Derry, their host being *Hypermercia angustana*, Hb. *Limneria erucator*, Gr., a number of both sexes were bred by Mr. Barker, from *Thera firmata*, Hb., while a solitary female of *Limneria rapax*, Gr., was bred by Mr. Adkin from *Pædisca sordidana*, Hb., the larvæ being from Forres. *Nemeritis macrocentra*, Gr., was bred from *Emmelesia albulata*, Schiff., by Mr. Adkin, the larvæ being from Shetland, and both sexes being represented; while from *Melitæa aurinia*, Rott., the same gentleman bred a solitary female of *Nemeritis cremastoides*,

Holmgr. A single female of the genus *Cremastus*, at present unidentified, was bred from *Retinia pinicolana*, Dbld., by Mr. Adkin, the larva being from the New Forest. *Mesochorus confusus*, Holmgr., was bred in some numbers by Mr. Adkin, from *Cidaria sagittata*, Fb., both sexes being represented, he also breeding a single female of *Mesochorus anomalus*, Holmgr., from an unknown host; these two species of Ophionidæ are hyper-parasites. *Exetastes osculatorius*, Fab., was bred by Messrs. Adkin and South from larvæ of *Retinia pinicolana*, Dbld., both sexes being represented; 13 specimens of *Banchus moniliatus*, Gr. (7 males and 6 females), by Mr. Croker, its host being *Trachea piniperda*, Panz.; while from *Cherocampa porcellus*, L. Mr. Adkin bred a male and female of *Banchus falcator*, Fab. A male and female of *Euryproctus nigriceps*, Gr., were bred by myself from the pupæ of the saw-fly, *Trichiosoma betuleti*, Cam.; it is only right to say that I am indebted for this handsome species to my friend, Mr. Winkley, who, I think, collected the pupæ in the neighbourhood of Wandsworth Common. *Mesoleius formosus*, Gr., was bred by myself from pupæ attached to a poplar leaf, and collected by Mr. South in Normandy, and to whose generosity I am indebted for the same. Mr. Frohawk has also reared several of the same species from *Gonepteryx rhamni*, L., the larvæ being from the New Forest; a solitary male of *Cteniscus succinctus*, Gr., was bred from *Boarmia abietaria*, Hb., by Mr. Barker; of the genus *Bassus*, but two species were bred, and both by myself, from pupæ found in my own garden at Peckham: one a very handsome and abnormally large female, *Bassus albosignatus*, Panz., the other being a male of *Bassus latatorius*, Fab. A male of *Pimpla instigator*, Fab., was bred by Mr. Barker from the larva of *Hadena oleracea*, L., while a male of *Pimpla scanica*, Vill., was bred by myself from a pupa of *Zygæna filipendulæ*, L., found attached to grass in Headly Lane. Mr. Adkin also bred a very beautiful female of *Pimpla oculatoria*, Fab., its host being *Pædisca sordidana*, Hb., the larva being from Forres; a single female of *Pimpla brevicornis*, Holmgr., fell to Mr. Wellman's lot from the larva of *Aciptilia galactodactyla*, Hb.; a single female of *Glypta flavolineata*, Gr., was bred by Mr. Adkin from the larva of *Cidaria sagittata*, Fb. To Mr. Elisha falls the honour, however, of breeding the only species, as far as I know, new to science, since my last paper, in *Glypta rubicunda*, Bridg., both sexes of which he seems to have bred freely, its host being *Argyrolepis maritimana*, Gn.; this species was described by Mr. Bridgman in a paper read

before the Norfolk and Norwich Naturalists' Society, Oct 29th, 1889. *Lissonota bellator*, Gmel., a single female of this species was bred by Mr. South from *Botys asinalis*, Hb., while Mr. Adkin reared a male and two females of the same species from *Pædisca semifuscana*, St., the larvæ being from Derry; while from larvæ of *Retinia pinicolana*, Dbl., taken at Oxshot, Surrey, Mr. Adkin bred a male and female of *Lissonota errabunda*, Holmgr. Of *Phytodietus segmentator*, Gr., a solitary male was bred from the larva of *Toxocampa craccæ*, Fb., by Mr. South. From a pupa attached to a geranium in my own garden I bred a female of the very rare *Xylonomus precatorius*, Fab.; this last species terminating the list of the Ichneumonidæ proper. Amongst the Braconidæ we have *Bracon brevicornis*, Wesm., bred by myself from larvæ of *Ephestia kuhniella*, Zell., of which I had upwards of 80 specimens, consisting of both sexes. *Bracon discoideus*, Wesm., a single female was bred by Mr. Adkin from the larva of *Retinia buoliana*, Schiff., this being, I believe, the first record of this species being bred from a Lepidopteron; its hosts are generally considered to be larvæ of several species of Curculionidæ. *Colastes braconius*, Hal., this solitary parasite of leaf-mining Lepidoptera and Diptera was bred in some numbers by Mr. Elisha from *Lithocolletis cavella*, Zell. and *L. faginella*, Mann; this is not Mr. Elisha's first experience with this very fragile insect, he having previously bred it from several other hosts. Two females and one male of the very fine and rare Bracon, *Pelecystoma lutea*, Nees, were bred by Mr. Adkin from larvæ of *Papilio machaon*, L. *Rhogas circumscriptus*, Nees, this very common solitary parasite was bred from a pupa found attached to a wall in one case, and from a *Psyche* case attached to a fence in another, both in the neighbourhood of Dulwich, by myself, both specimens being females. Four specimens of *Ascogaster varipes*, Wesm., were bred by Mr. Adkin from larvæ of *Hypermercia augustana*, Hb., from Derry; the only previous records of this species are one male taken in Epping Forest, and another by Mr. Bridgman at Norwich. The same host produced Mr. Adkin several specimens of *Ascogaster instabilis*, Wesm., of both sexes. *Apanteles congestus*, Nees, was bred in some numbers by myself from a cluster of cocoons found attached to a thistle leaf at Woking. *Apanteles rubripes*, Hal., was bred in some number by Mr. Carpenter from larvæ of *Pieris brassicæ*, L. *Apanteles zygænarum*, Marsh., was bred by Mr. South, no less than 13 specimens, 8 females and 5 males, being produced from a single larva of *Phigalia pedaria*,

Fb.; both sexes of *Apanteles caiaë*, Bouché, were bred by Messrs. Adkin and South from larvæ of *Aphomia sociella*, L.; from larvæ of *Diloba cæruleocephala*, L. Mr. South bred 15 and 14 specimens respectively (most of them being females) of *Apanteles juniperata*, Bouché. The small species, *Apanteles nothus*, Reinh., was bred by Mr. Wellman in some numbers from *Anticlea badiata*, Hub., both sexes being represented. The very common *Apanteles difficilis*, Nees, was bred by myself from a larvæ of *Pæcilocampa populi*, L., found by Mr. South at Mickleham, no less than 38 specimens emerging from the caterpillar; while Mr. Cooper has bred the same species from larvæ of *Spilosoma menthastri*, Esp. *Apanteles marginatus*, Nees, was bred by Mr. Elisha from *Gracilaria omissella*, Dougl.; the last species of *Apanteles* being the very common and gregarious *Apanteles ruficrus*, Hal., which was bred in some numbers by Mr. South from larvæ of *Diloba cæruleocephala*, L., no less than 34 emerging from one larva; *Microplitis ocellatæ*, Bouch., a common parasite of the hawk moths, was bred by Mr. Cook from the larva of *Smerinthus ocellatus*, L. *Microplitis tristis*, Nees, was bred by Mr. West of Brixton, from the larva of *Dianthæcia capsicola*, Hb.; also by myself from two larvæ of *Vanessa urtica*, L., 12 specimens emerging from one larva, and 15 from the other. *Microplitis spectabilis*, Hal., this, the smallest species of the genus, was bred by Mr. Croker from the larva of *Cidaria testata*, L., the same host producing for Mr. Croker the common *Microplitis tuberculifera*, Wesm. Of the Microgasteridæ but three species came under my notice, the first being the very common autumnal parasite of Geometræ, *Microgaster alvearius*, Hal., of which species Mr. Winkley bred 37 specimens from a single larva of *Urapteryx sambucaria*, L.; while Mr. Turner bred 33 from a solitary larva of *Boarmia gemmaria*, Brahm. *Microgaster flavipes*, Hal., was bred in some numbers by myself from a cluster of cocoons found attached to a leaf of a plum tree growing in my garden, host unknown. Both sexes of *Microgaster calceatus*, Hal., were bred by Mr. Barker from *Thera variata*, Schiff. Amongst the sub-family Agathidides we have had only one genus and species bred, *Orgilus obscurator*, Nees, Mr. Adkin breeding both sexes from larvæ of *Hypermercia augustana*, Hb., from Derry, also a single female from *Retinia pinicolana*, Dbl., from the New Forest. Mr. South has also bred both sexes from *Retinia buoliana*, Schiff. Of the Meteoridæ, of which the single genus comprises some 32 species, 5 only have been brought under my notice: the first being *Meteorus albi-*

ditarsus, Cur.; of this solitary parasite a female only was bred by Mr. Hall from the larva of *Abraxas grossulariata*, L.; this very uncommon parasite was also bred by Mr. Adkin from *Melitæa aurinia*, Rott., a male and two females being the result. According to the Rev. T. A. Marshall this species has not been noticed by any writer but Haliday, who discovered it in North Ireland and the Hebrides; four specimens have, however, since been bred by Messrs. Bignell and Fletcher, its host being *Eupithecia expallidata*, Guenée. *Meteorus ictericus*, Nees, the commonest of the British species, has been bred by Mr. Adkin from *Pædisca sordidana*, Hb., type form, and both sexes; while from *Tortrix piceana*, L. he has reared 2 males and a female, varieties of the same species. Mr. Wellman has also bred it from *Hyponomeuta plumbellus*, Schiff. *Meteorus pallidipes*, Wesm., both sexes of this apparently rare species have been bred by Mr. Adkin from larvæ of *Pædisca sordidana*, Hb.; while from *Tortrix piceana*, L. Mr. Adkin has bred both sexes of *Meteorus punctiventris*, Ruthe; and a single male of *Meteorus unicolor*, Wesm., was bred by Mr. South from the larva of *Tethea retusa*, L. Amongst the Macrocentrides, we have that very delicate and fragile-looking parasite, *Macrocentrus thoracicus*, Nees, two females and one male, bred by Mr. C. Fenn, from larvæ of *Tortrix branderiana*, St.; while from *Pædisca sordidana*, Hb., Mr. Adkin bred a single female of *Macrocentrus marginator*, Nees, Mr. Waller breeding two females from *Sesia culiciformis*, L. The very abundant and gregarious species, *Macrocentrus abdominalis*, Fab., was bred by Mr. C. Fenn from *Tortrix branderiana*, St., in some numbers, but females only. Mr. Turner bred *Macrocentrus infirmus*, Nees, from the larva of *Zeuzera pyrina*, L., both sexes, and in great numbers, no less than 157 specimens emerging from one larva; large as this number may seem, it has been outdone by Mr. Bignell, who once bred no less than 172 from a single caterpillar of *Hydræcia petasis*, Dbl. *Zele discolor*, Wesm., this exceeding rare Bracon was bred by Mr. Barker from the larva of *Boarmia abietaria*, Hb.—one of each sex. *Copidosoma cidaria*, Th., this minute parasite was bred in immense numbers by Mr. Short from *Thera firmata*, Hb., no less than 472 being bred from one larva; it was also bred from *Emmelesia unifasciata*, Haw., by Mr. Adkin. From the ova of Lepidoptera I succeeded in rearing two small forms of *Oxyuridæ* in *Telenomus nitidulum*, Walk., from ova found attached to sawfly at Horsley, parent unknown, and *Telenomus phalænarum*, Nees, from the ova of *Pygæra curtula*, L. This concludes the list

of Ichneumonidæ, but I have to add eight species of Diptera to the present list: the first being *Trixa variegata*, Meig., one female of which Mr. South bred from *Cheimatobia boreata*, Hb. *Nemoræa notabilis*, Mg., was bred from the larva of *Plusia festuæ*, L., by Mr. Adkin, one male and two females; while three females of the very rare *Nemoræa nigrithorax*, Mg., were bred by Mr. Fenn from the larva of *Saturnia pavonia*, L.; both sexes of the very handsome *Masicera sylvatica*, Mg., were bred by Messrs. Fenn and Winkley, one from *Saturnia pavonia*, L., and the other from *Pieris brassicæ*, L. Three specimens, a male and two females of *Plagia curvinervis*, Flin., were bred from the larva of *Pædisca sordidana*, L., by Mr. Adkin; while from the same host he bred a single female of *Hypostena medorina*, Schin. *Phorocera concinnata*, Mg., was bred in some numbers from *Vanessa urticæ*, L., both by Messrs. Frohawk and Winkley. *Tachina tibialis*, Mg., was bred by Mr. Frohawk from *Vanessa urticæ*, L., both sexes being represented; and from larvæ of the celery fly, *Acidia heraclei*, L., I have bred both sexes of the very beautiful Chalcid, *Phargonia smaragdula*.

It only remains for me to thank very heartily the members of the Society who have so very kindly responded to my invitation to save the parasites that they may breed from time to time, and thus enabled me to so largely add to my previous list. I can only hope that others may be induced to follow in the future the very admirable example set by the gentlemen I have named, and thus enable me to produce a much more formidable list on some future occasion.



Notes upon Terrestrial Mollusca found near Toulon.

By JOHN T. CARRINGTON, ESQ. Read April 23rd, 1891.

During my stay in the Riviera in the South of France, extending from November until February of the past winter, 1890-91, I occupied some of my time by collecting the land snails of the district surrounding the city of Toulon. My head-quarters were on the shores of the Mediterranean, some little distance from the city, and near the picturesque Cap Brun. This portion of the Riviera is not one that would be chosen by a naturalist who went in the summer time, because, like other districts of Southern Europe, where the soil will yield four crops in a year to the industrious

peasantry, uncultivated land is not easily accessible. Still, with a little energy and frequent back aches from too much turning of stones, a very pretty collection of shells may be made in the neighbourhood, in the winter months. Unfortunately the past winter was of exceptional severity, so that everything was frozen hard for several weeks at a time, thus interfering much with collecting these shells, so that the chief results of my efforts was only from a few weeks in the latter part of January and until the middle of February. The hybernation of the mollusca was very complete in most species, the winter epiphragm being thickly developed in most of the genus *Helix* and in those allies which are furnished with such a protection. No doubt if one worked at a different season and under more favourable circumstances, that portion of France would yield a much better harvest, both as regards variety of species and numbers of some which I found difficult to obtain. Nevertheless, considering the season in which I collected, the finding of about twenty-five kinds and many beautiful varieties was encouraging. Of these twenty-five, nine are known to occur in Great Britain; but even these were all more or less interesting as differing from their northern relatives. I exhibit to-night fifteen species, on some of which I will remark, and append a full list of my collection. For identifying some of these, examining all of them, and describing several new forms, I am greatly indebted to our member Mr. T. D. A. Cockerell.

One of the most striking of the Riviera shells is that of *Zonites algirus*, which is not easy to find alive in winter. By turning over large stones on the side of Mont Faron, beyond the limit of cultivation, a few immature specimens occurred. Dead shells of good size and preservation, are, however, frequent, especially in the crevices of old walls on the road beyond the back of that mountain. It is evidently a common species of the district.

Locally, on different parts of the rough face of Mont Faron, might be found little groups of *Leucochroa candidissima*, which simply lies about on the surface of the ground, apparently seeking no cover for its winter shelter. This beautiful shell is called by the French the porcelain helix, from its dead white unglazed-porcelain appearance. It may be easily overlooked as a dead *Helix* shell, bleached very white by the sunshine; but on taking up a living specimen one sees the delicate epiphragm white as a freshly spun compact spider's covering of its eggs. I found this species also on the mountains in the Gorge of Ollirole about eight

miles west of Toulon. No doubt it is generally distributed through the South of France.

Helix vermiculata was found in lower localities at the foot of the mountains down to the sea shore. It is fond of hybernating under heaps of stones over which moss and grass have grown. This species has a very distinct winter diaphragm of considerable strength. There is much variation in the markings of the shells. Large basketsful of this mollusc are to be seen during open weather for sale in the markets, for it is commonly eaten by the inhabitants. I found the forms *concolor* and *subfasciata* among others.

Helix aspersa, so familiar to us in England, is the other species offered for sale in the markets, while many shop windows display tempting dishes full of cooked examples of this and *H. vermiculata*. The *H. aspersa* I obtained are considerably unlike those we find in this country. They are more open at the mouth, different in texture, coloration and pattern. I only got one other specimen beyond those I exhibit, but as these are all much of the same kind, it is probable that they are representative. These were turned out of hybernal retreats far in the crevices of rocks on Mont Faron. Among them is the variety *grisea*. *Helix aperta*, by some authors considered a local form of *H. aspersa*, is represented by a long series of this unvarying shell. As it occurs more frequently than does *H. aspersa* in winter, and does not, so far as I have seen, make any epiphragm, one finds much difficulty in believing it to be only a variety of our common *Helix*. This South European *H. aperta* considerably puzzles one on first seeing it on the very dry banks where it occurs, for it looks so much like a member of the aquatic genus *Limnea*, that the first thought is where can be the water from which it has crawled.

High up on Mont Faron I found the very beautiful *Helix splendida* by turning stones; it is locally distributed, being frequent in some places, and not to be found in others near by. It is a most variable species, and when the shell contains the living animal is indeed, as its name signifies, splendid in bright colour. Mr. Cockerell has noticed two of the forms found by me as new. When searching under stones for *H. splendida* we must beware of scorpions, which frequently hybernate in company with the snails. Although half sleepy, they are often quite active enough to resent an untimely visit.

On waste ground near Fort Malgue, some curious forms of *Helix virgata* occur; two of these have been named by

Mr. Cockerell respectively *subdeleta* and *subscalaris*. I also found the forms *fasciata* and *lutescens*, all of which I exhibit here to-night.

The little *Helix trochoides* is a mountain species under stones. You will observe both the type and the variety *fasciata*.

In the same localities, but only under very large stones, I found the curious *Stenogyra decollata*, with its mutilated-looking shell. As you will see in one very small specimen, the top of the shell seems to be intact in its younger state, but is beheaded at a later date, for the more mature shells are never perfect. In the new museum of Toulon the smaller forms are named var. *minima*; but there seems no reason to think that they are other than growing shells.

Helix pisana is very abundant along the seashore on dry banks and cliffs. It appears in great variety, several forms of which I exhibit. These run one into the other very closely, but are not difficult to sort out with a little practice.

By searching garden walls, of which there are far too many around Toulon to please a naturalist, we find *Pupa cineria*, well named from its burnt and faded appearance. In a like locality, by the side of a stream, I found *Clausilia bidens* in abundance hybernating in crevices.

Everywhere we find examples of the very pretty *Cyclostoma elegans*, so well known to you as inhabiting limestone and chalky places in England. Of this species I got the forms *pallida* and *maculosa*.

The curious little shell of *Pomatias patula* is found at the foot of rocks, both near the sea and all the way up to a considerable height up the mountains. In some places it is not common, but in others more favourable it is in great abundance.

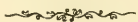
I think I have said sufficient about my exhibits to draw your attention to the subject of collecting shells when away from home as a very charming addition to any other pursuits we may follow more particularly.

List of Terrestrial Mollusca found by Mr. J. T. Carrington.

By Mr. T. D. A. COCKERELL.

Amalia gagates forma *typus* Less. and Poll., *Agriolimax agrestis* forma *obscurus* (Moq.-Tand.), *Hyalinia draparnaldi* (Beck.), *Zonites algerus* (Linn.), *Leucochroa candidissima* (Drap.), *Helix glabella*, (Drap.), *Helix cantiana* var. *minor*, Moq.-Tand., *Helix carthusiana*, Mull., *Helix vermiculata*, Müll., *Helix vermiculata* forma aff. *concolor*, Moq.-Tand., *Helix vermiculata* forma aff. *subfasciata*, Moq.-Tand., *Helix splendida*,

Drap., *Helix splendida* forma *tersonia*, Moq.-Tand., *Helix splendida* forma nov. (aff. *tournaia*, Moq.-Tand.) with band-formula :: 4 ; *Helix splendida* forma nov. with band-formula (: ::) 4 ; *Helix aspersa*, Müll., *Helix aspersa* var. *grisea*, Moq.-Tand., *Helix aperta*, Born., *Helix pisana*, Müll., *Helix pisana* forma *interrupta*, Moq.-Tand., *Helix pisana* forma *bifrons*, Moq.-Tand., but the bands below only near aperture, *Helix pisana* forma *maritima*, Moq.-Tand., *Helix pisana* forma *concolor*, Moq.-Tand., *Helix pisana* forma *albida*, Moq.-Tand., *Helix virgata*, DaCosta, *Helix virgata* forma *fasciata* Moq.-Tand., *Helix virgata* forma *lutescens*, Moq.-Tand., *Helix virgata* forma *subdeleta*, Ckll., *Helix virgata*, monst. nov. *subscalaris*—Spire elevated more or less scalariform; max. diam. 13, alt. 9 mill., colour of f. *subdeleta*. *Helix virgata* forma nov. *bileucozona*—like f. *leucozona*, Taylor, but with also a broad white band below the suture, which becomes obliterated near the mouth. *Helix cespitum*, Drap., *Helix cespitum* forma *lentiginosa*, Moq.-Tand., *Helix conspurcata*, Drap., *Helix trochoides*, Poir., *Helix trochoides* forma *fasciata*, Moq.-Tand., *Chondrula quadridens* (Müll.), *Cionella folliculus* (Gronov.), *Stenogyra decollata* (Linn.), *Pupa cinerea*, Drap., *Pupa variabilis*, Drap., *Clausilia solida*, Drap., *Clausilia bidens*, subsp. *virgata* (Jan.), *Cyclostoma elegans* (Müll.), *Cyclostoma elegans* forma *pallida*, Moq.-Tand., *Cyclostoma elegans* forma *maculosa*, Moq.-Tand., *Pomatias putulus* (Drap.)



Notes on 'A Few Days' Collecting at Eastbourne in August last.

By R. ADKIN, ESQ. Read November 26th, 1891.

If an apology be necessary for occupying your time by the exhibition of a collection of ordinary forms of Lepidoptera, the one that I have brought this evening should merit it; but as I believe that any collection representative of a given time and district cannot be without some matters of interest, I venture to present to your notice the result of my summer holiday spent at Eastbourne, Sussex, in August last, for the most part between the 10th and 23rd, but with four or five odd days covering a period of nearly five weeks, from the 1st of that month to 3rd September.

Some few days in the first week in August were, I understand, warm and calm, but business engagements prevented my availing myself of whatever collecting might have been done at that time, and the weather later in the month was far from favourable; high winds prevailed throughout, rendering beating a simple impossibility in the more exposed places where it is generally most productive, and the rain-fall also was excessive, reaching its climax on the night of 21st, when no less than 1·12 inches fell in six hours. Despite these

adverse circumstances common species were quite as fully represented as usual, perhaps even more abundantly so; indeed, the crowd of butterflies that rose from one's feet when walking through the long grass on the sea front was a sight to be remembered—a motley multitude, possibly driven together by stress of weather where some little shelter might be found.

The following is a list of my captures:—

Among the butterflies, the Pieridæ were represented by *Pieris brassicæ*, L., *P. rapæ*, L., and *P. napi*, L., all equally common, thus contrasting strongly with their appearance in 1887, when, although the two first-named species were unusually abundant, the last was so scarce that I failed to detect a single specimen, although I was over the same ground frequently, and at the same time of the year.

Argynnis aglaia, L., pursued his wild career over the broken ground of the undercliff. The majority of the specimens secured were in a dilapidated condition; but in one, apparently freshly emerged, the fore-wings were unequally developed, that on the left side being less than half the size of that on the right, and in the smaller wing the rows of round spots and submarginal crescents are united, forming broad streaks both on the upper and under side.

Satyrus semele, L., and *Epinephele ianira*, L., were very common. Some few *Pararge megæra*, L., were flying about the precipitous fronts of the cliffs, and the second broods of *Cænonympha pamphilus*, L., and *Polyommatus phlæas*, L., were just beginning to appear.

Lycæna corydon, Fb., was well out when I arrived on the scene at the beginning of August, and continued very common during my stay, as did *L. icarus*, Rott. *L. bellargus*, Rott., was first noted on 22nd, and continued to appear in increasing numbers up to the time I left. I spent a good deal of time in examining these species whenever practicable, but although so common on the wing in the morning sunshine and at rest on the grass stems, knapweed flowers, etc., on the calmer evenings, they were missing when it was dull and stormy. That such a multitude should suddenly disappear was evidently impossible, and I resolved to find out, if possible, what became of them. After a lengthened search among the dense clumps of grass, where I found some few resting in sheltered positions, and searching lower and lower in among the clumps I began to find them more commonly until I hit upon the majority almost down among the roots. No unusual variation was noted. *L. corydon* produced some

few undersides in which the inner marginal spots were elongated or united, forming horse-shoes. *L. icarus* also presented a similar phase or variation, and the variety *icarinus*, Scriba., in which the basal spots are absent. The majority of the females were of a very ordinary brownish shade on the upper surface, but in one particular spot—an old disused chalk pit—those having a distinct blue shade were in the ascendency.

But among the butterflies there was one notable blank, the *Vanessæ*. Generally by the middle of August the commoner species are frequent visitors to the privet, thistles, and other flowers then in full bloom, or are seen sunning themselves on the roads and chalky cliffs; but up to the time of leaving not a solitary *V. atalanta*, L., *V. io*, L., or *V. cardui*, L., nor a larva of either species was seen, the only representative of the genus that put in an appearance being *V. urticæ*, L., of which two imagines and two nests of larvæ were found.

The Sphinges were represented by a single specimen of *Macroglossa stellatarum*, L., that was seen hovering about a crowd of people assembled on the parade watching an entertainment; and *Zygæna filipendulæ*, L., which occurred on the Downs in considerable numbers, a variety having the two central or two outer spots united, being very frequent, as it usually is in this locality; but I have so far failed to find one in which the two pairs are run into a blotch. One taken appeared to have a third antenna, but upon examination it was found in this case, as in one submitted to the Society by Mr. South some time since, that what appeared to be the third antenna was in reality its pupal sheath, from which it had failed to free itself upon emergence. The only Bombyx taken was a solitary example of *Hepialus sylvinus*, L.

Noctuæ were fairly well represented. *Bryophila perla*, Fb., was common on walls and variable in coloration, some examples being slaty, other much suffused with yellow; but a diligent search failed to produce *B. muralis*, Forst., although several journeys were made to places where it is usually common. *Leucania pallens*, L., was fairly common at flowers and sugar, but generally in worn condition, as was *L. conigera*, Fb. *Xylophasia monoglypha*, Hufn., came to sugar freely, and was wonderfully uniform in tint. *Apamea didyma*, Esp., was not uncommon at rest on walls, etc., about the town, and some few came to ragwort, etc., in the evening. *Miana bicoloria*, Vill., was on the wing in thousands nightly at early dusk, but rarely visited either the natural or artificial sweets after dark. The form was that usually found upon the chalk,

but showed a considerable range of coloration. *Caradrina taraxaci*, Hb., *Agrotis nigricans*, L., *Triphæna pronuba*, L., and *T. comes*, Hb., came to both sugar and flowers of knapweed, ragwort, wood sage, etc., in some numbers, while a single specimen of *T. interjecta*, Hb., was taken at the latter. *Noctua xanthographa*, Fb., *N. c-nigrum*, L., *N. plecta*, L., and *N. umbrosa*, Hb., appeared to prefer knapweed flowers, the two first named species coming to them very freely. *Plusia gamma*, L., was on the wing by day and by night, but not in any great abundance; and one was taken on a knapweed flower after dark, as was also one *P. festuæ*, L.

Comparatively few species of Geometræ were noted, but some of them occurred in considerable numbers. *Abraxas grossulariata*, L., for instance, occurred in ones and twos wherever I went, but on returning home one evening some time after dark, I came upon such a swarm of them as I had never before seen; hundreds were flying about a small clump of blackthorn bushes on the edge of the cliff, but were all in the most dilapidated condition. *Acidalia marginipunctata*, Göze, was common in its usual haunts, resting upon the rough stones along the sea front, exposed to the full force of the storms, which soon affected its condition. It was first noted on August 13th, when one only was seen, and was found in increasing numbers until the end of the month, the largest number, forty, being found on 30th. Its range of variation was considerable, some examples being a bone colour with clearly defined markings, while others were much obscured by a dark grey shading. *Gnophos obscuraria*, Hb., occurred very sparingly, the only four specimens taken being of the usual chalk form. I have frequently searched the most likely looking hill sides in the neighbourhood by lamp-light, in the hope of finding this species in some numbers, but so far my endeavours have been altogether unsuccessful. *Melanippe fluctuata*, L., was fairly common on walls, and one was taken at knapweed; *M. galiata*, Hb., *Coremia ferrugata*, Clerck., *C. unidentaria*, Haw., and *Eubolia bipunctaria*, Schiff., were met with sparingly, and a single example of *Timandra amataria*, L., was taken on August 22nd in fair condition.

But what struck me most was the almost total absence of any Pyrales. Some years ago the rough sea front near the town was a very paradise for this interesting group. A large portion of this was long since converted into a parade, and since that time several of the species formerly common have disappeared, but until some two years ago one species, *Stenia punctalis*, Schiff., continued to appear in abundance; but this

year a continual look out for it revealed but one worn specimen. Could the warm weather of June have brought it out so much earlier than usual that I altogether missed it, or has the march of civilization completely driven it from one of its former strongholds?

Tortrices and Tineæ call for no special comment, the number taken was very small and the species only the most ordinary.

Larvæ were not systematically worked, but it was noted that those of *Phalera bucephala*, L., were very common on the csiars, where *Halias chlorana*, L., also occurred. A couple of nests of *Vanessa urticæ*, L., were feeding on the nettles, and *Peronea permutana*, Dup., had been abundant among *Rosa spinosissima*, L., as usual, but had pupated. These, together with an occasional *Acronycta aceris*, L., and *Plusia gamma*, L., bring the list to a close.



LIST OF MEMBERS.

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Chief subjects of Study:—*h*, Hymenoptera; *o*, Orthoptera; *he*, Hemiptera; *n*, Neuroptera; *c*, Coleoptera; *d*, Diptera; *l*, Lepidoptera; *orn*, Ornithology; *r*, Reptilia; *m*, Mollusca; *cr*, Crustacea; *b*, Botany; *mi*, Microscopy; *e*, signifies Exotic forms.

—•—

YEAR OF ELECTION.

- 1886 ADKIN, B. W., Brandon House, Morden Hill, Lewisham, S.E.
l, orn.
- 1882 ADKIN, R., F.E.S., Wellfield, 4 Lingard's Road, Lewisham,
S.E. *l.*
- 1886 ADYE, J. M., Somerford Grange, Christchurch, Hants. *l.*
- 1891 ANDERSON, R. J., Suez.
- 1888 ATHERTON, R., Chorley, Lancashire. *l.*
- 1889 ATKINSON, F. H., 51, Buckingham Palace Road, S.W. *l.*
- 1888 ATMORE, E. A., F.E.S., 2, Haylett Terrace, King's Lynn,
Norfolk. *l.*
- 1888 AULD, H. A., Havelock House, Foot's Cray, Kent. *l.*
- 1887 BARCLAY, F. H., Leyton, Essex. *l, orn, palæontology.*
- 1884 BARKER, H. W., F.E.S., *Hon. Sec.*, 147, Gordon Road,
Peckham, S.E. *l.*
- 1887 BARREN, H. E., 46, Lyndhurst Road, Peckham, S.E. *l.*
- 1889 BARRETT, C. G., F.E.S., *President*, 39, Linden Grove, Nun-
head, S.E. *l, m.*
- 1889 BEAUMONT, A., F.E.S., 153, Hithergreen Lane, Lewisham,
S.E. *l, c, orn.*
- 1888 BENNETT, W. H., 62, St. Mary's Terrace, West Hill, Hastings.
h, c.
- 1888 BILLUPS, P. C. C., M.D., 24, Shepherd Street, New Swindon.
mi.
- 1877 BILLUPS, T. R., F.E.S., 20, Swiss Villas, Coplestone Road,
Peckham, S.E. *h, o, c, d, he.*
- 1891 BIRD, G., The Manor House, West Wickham, Near Becken-
ham, Kent.

YEAR OF
ELECTION.

- 1892 BLACHFORD, J. V., M.B., M.R.C.S., Lambeth Infirmary, S.E.
 1873 BOLGER, H. L., Chislehurst, Kent. *l.*
 1887 BRIGGS, C. A., F.E.S., Surrey House, Leatherhead, Surrey.
 l, m, British Fishes.
 1887 BRIGGS, T. H., M.A., F.E.S., Surrey House, Leatherhead. *l.*
 1891 BRIGGS, H. MEAD, 17, St. George's Place, Canterbury, Kent.
 1890 BRIGHT, P., Roccabrunna, Bournemouth. *l.*
 1890 BRISTOWE, B. A., F.E.S., Durlstone, Champion Hill, S.E. *l.*
 1891 BROWN, H. ROWLAND, B.A., F.E.S., Oxley Grove, Harrow
 Weald, Middlesex.
 1890 BROWN, E. W., Lieut., 2nd Battalion, Royal West Kent
 Regiment, Shorncliffe Camp, Kent. *l.*
 1890 BRYANT, G., F.E.S., Somerset Lodge, Old Shirley, South-
 ampton. *l.*
 1892 BURT, J. R., 3, Kempshot Road, Streatham, S.W.
 1890 BUTLER, W. E., 297, Oxford Road, Reading. *l.*
 1887 BUTTERFIELD, J., 110, Lewisham Road, S.E.
 1888 CANSDALE, W. D., F.E.S., 40, London Road, Forest Hill,
 S.E. *l.*
 1889 CANT, A., F.E.S., 10, Chandos Street, Cavendish Square, W. *l.*
 1886 CARPENTER, J. H., Johnson Villa, Gleneagle Road, Streatham,
 S.W. *l.*
 1877 CARRINGTON, J. T., F.L.S., Bream's Buildings, Chancery Lane,
 W.C. *l, cr.*
 1872 CHAMPION, G. C., F.Z.S., F.E.S., 11, Caldervale Road, Elm
 Park, Clapham, S.W. *c.*
 1872 CHANEY, W. C., 32, Stroud Road, Woodside, S. Norwood,
 S.E. (*Hon. member*). *h, l, c.*
 1888 CHITTENDEN, D., Wellesboro' Lees, Ashford, Kent. *l.*
 1887 CLARK, J. A., F.E.S., The Broadway, London Fields, E. *l.*
 1890 CLARK, R. A., M.A., Rossall School, Fleetwood, Lancaster. *l.*
 1888 CLARKE, A. L., 24, Estelle Road, Mansfield Road, Gospel
 Oak, N.W. *l, b.*
 1879 CLODE, W. (*Life member*).
 1886 COCKERELL, T. D. A., F.Z.S., F.E.S., The Institute of Jamaica,
 Kingston, Jamaica. *h, d, m.*
 1889 COLLINGS, C. H., 172, Strand, W.C. *h.*
 1884 COOK, A. E., 31, Lower Road, Rotherhithe, S.E. *l, orn, r.*
 1884 COOPER, J. A., Sussex Villas, Harrow Road, Leytonstone
 Road, E. *l, orn.*

YEAR OF
ELECTION.

- 1890 COX, E. W. SINCLAIR, 1, Temple Gardens, E.C.
- 1890 CRANE, P. J., Holly House, Chingford, Essex. *l*.
- 1885 CROKER, A. J., F.E.S., 26, Saxon Road, Selhurst, Surrey. *l. c.*
- 1891 DACIE, J. C., Mayfield, 105, Upper Richmond Road, Putney,
S.W. *m, l*.
- 1886 DAY, G., F.R.M.S., 19, Garlick Hill, E.C. *orn, mi*.
- 1888 DAWSON, W. G., Plumstead Common, Plumstead, Kent (*Life member*). *l*.
- 1889 DENCH, G. E., *l*.
- 1889 DENNIS, A. W., 48, Mansfield Street, Kingsland Road, E. *l*.
- 1890 DENNIS, G. C., 11, Tower Street, York. *l*.
- 1891 DEWEY, A. E., 35, Moore Park Road, Walham Green, W.
- 1890 DOBRÉE-FOX, Rev. E. C., Castle Moreton Vicarage, Tewkesbury. *l*.
- 1884 DOBSON, H. T., Douglas Villa, Acacia Road, New Malden, Surrey. *l, orn*.
- 1884 DOWNING, J. W., F.E.S., 59, Lupus Street, Pimlico, S.W. *l*.
- 1886 DUNNING, J. W., M.A., F.L.S., F.Z.S., F.E.S., 12, Old Square, Lincoln's Inn, W.C. (*Hon. member*).
- 1886 EDWARDS, S., F.Z.S., F.E.S., Kidbrook Lodge, Blackheath, S.E. *l, e l*.
- 1877 ELISHA, G., F.E.S., 122, Shepherdess Walk, City Road, E. *l*.
- 1886 ENOCK, F., F.E.S., 12, Parolles Road, Upper Holloway, N.
d, mi.
- 1892 EVANS, J., 52, Stockwell Park Crescent, S.W. *l*.
- 1890 FARINI, G. A., Dartmouth Lodge, Forest Hill, S.E.
- 1889 FARRANT, M., 74, Cambridge Street, Pimlico, S.W. *l*.
- 1887 FARREN, W., F.E.S., 14, King's Parade, Cambridge. *l*.
- 1888 FENN, C., F.E.S., Eversden House, 83, Burnt Ash Hill, S.E. *l*.
- 1888 FENTON, F. E., The Cedars, Ealing.
- 1872 FICKLIN, A., Norbiton, Surrey. *l*.
- 1891 FILER, F. E., 58, Southwark Bridge Road, S.E.
- 1887 FITCH, E. A., F.L.S., F.E.S., Brick House, Maldon, Essex.
l, c, hy.
- 1887 FLETCHER, W. H. B., M.A., F.E.S., Fairlawn House, Worthing, Sussex (*Life member*). *l*.
- 1887 FOWLER, The Rev. Canon, M.A., F.L.S., F.E.S., The School House, Lincoln. *c*.

YEAR OF
ELECTION.

- 1889 FORD, A., Clarendon House, Upper Lower Road, St. Leonards-on-Sea. *l, c.*
- 1891 FORRESTER, A. C., 99, Endlesham Road, Nightingale Lane, Clapham, S.W.
- 1889 FORTUNE, R., Ravensgill, Franklin Mount, Harrogate. *orn.*
- 1886 FREMLIN, H. S., M.R.C.S., L.R.C.P., F.E.S., Mereworth, near Maidstone, Kent. *l.*
- 1886 FROHAWK, F. W., F.E.S., 9, Dornton Road, Balham, S.W. *l.*
- 1889 GERRARD, V., 47, Foulden Road, Stoke Newington, N. *l.*
- 1884 GIBB, L., 148, St. James Street, Montreal, Canada. *l.*
- 1885 GOLDTHWAITE, O. C., F.E.S., Meadow Side, Edinburgh Road, Carshalton, Surrey. *l.*
- 1888 GOULD, A. E. D., 61, Cornwall Road, Notting Hill, W.
- 1889 GREENE, Rev. J. G., M.A., F.E.S., Rostrevor, Apsley Road Clifton, Bristol. *l.*
- 1888 HALL, A. E., F.E.S., Norbury, Sheffield. *l.*
- 1884 HALL, T. W., F.E.S., Stanhope, The Crescent, Croydon, Surrey. *l.*
- 1891 HAMM, A. H., 46, Granby Gardens, Reading.
- 1892 HARRISON, A., F.R.C.S., Thames Sugar Refinery, Silvertown, E.
- 1888 HAWES, F. W., Grasmere, Torrington Park, Finchley, N. *l.*
- 1887 HAYWARD, H., 53, Fenwick Road, Peckham, S.E.
- 1884 HELPS, J. A., Newstead Lodge, 91, Wood Vale, Forest Hill, S.E. *l.*
- 1886 HENDERSON, J., 25, Madeira Road, Streatham, S.W. *l, orn.*
- 1878 HICKLING, G. H., Landon Cottage, Elm Road, Sidcup. *l.*
- 1890 HILL, H. A., F.E.S., 132, Haverstock Hill, Hampstead, N. *l.*
- 1888 HILLMAN, T. S., F.E.S., Eastgate Street, Lewes, Sussex. *l.*
- 1889 HINCHLIFF, Miss K. M., Worlington House, Instow, N. Devon. *l, c l.*
- 1890 HODGES, A. J., 2, Highbury Place, Islington, N. *l.*
- 1888 HOPKINS, H. E., 153, Camden Grove, Peckham, S.E. *l.*
- 1889 HORNE, A., 31, Watson Street, Aberdeen. *l.*
- 1889 HOWGRAVE, W., 56, Granville Park, Blackheath, S.E. *l.*
- 1889 HUDSON, T., 8, Berkeley Street, Battersea Park Road, S.W. *l.*
- 1887 INCE, C. E. M., 11, St. Stephen's Avenue, Shepherd's Bush, W. *l, c.*
- 1886 JÄGER, J., 180, Kensington Park Road, Notting Hill, W. *l.*

YEAR OF
ELECTION.

- 1888 JAPP, A. H., LL.D., The Limes, Elmstead, near Colchester.
orn.
- 1887 JENNER, J. H. A., F.E.S., 4, East Street, Lewes, Sussex. *l, c, d, m, b.*
- 1884 JOBSON, H., 1, Rock Villas, Maynard Road, Walthamstow, E. *l.*
- 1889 JOHNSON, C. F., Brinnington, Stockport, Cheshire. *l.*
- 1887 JOHNSON, Rev. W. F., M.A., F.E.S., Winder Terrace, Armagh, Ireland. *l, c.*
- 1886 KANE, W. F. DE V., M.A., F.E.S., M.R.I.A., Sloperton Lodge, Kingstown, Co. Dublin. *l, m, marine invertebrata.*
- 1888 KATZ, J., 34, Beverley Road, Anerley, S.E. *histology.*
- 1887 KEAYS, A. M., A.S.T.E., M.S.A., Wandle Cottage, Croft Road, Sutton, Surrey.
- 1887 KEDGLEY, C., Hibernia Chambers, Borough, S.E.
- 1887 KELSALL, J. E., Fareham, Hants. *orn, r.*
- 1884 KENWARD, J., Rosslyn, New Eltham, Kent. *l.*
- 1888 KIMBER, Miss M., F.E.S., Cope Hall, near Newbury, Berks. *l.*
- 1888 KNIGHT, E., 2, Lichfield Grove, Finchley, N.
- 1892 LARKIN, J. W., 48, Buckleigh Road, Streatham Common, S.W.
- 1887 LEECH, J. H., B.A., F.L.S., F.Z.S., F.E.S., F.R.G.S., 29, Hyde Park Gate, S.W. *macro-l, etc., of Wallace's palæarctic region.*
- 1889 LEGROS, A. V., 57, Brook Green, Hammersmith.
- 1889 LEMMON, C. H., 129, Hawkstone Road, Rotherhithe, S.E.
- 1884 LEVETT, C., 104, Malpas Road, Brockley, S.E. *l.*
- 1890 LEWCOCK, G. A., 73, Oxford Road, Islington, N. *c.*
- 1872 LUBBOCK, The Right Hon. Sir JOHN, Bart., M.P., D.C.L., F.R.S., F.L.S., F.G.S., F.E.S., etc., High Elms, Down, near Farnboro', Kent (*Hon. member*). *h, b.*
- 1890 MCARTHUR, H., 35, Averill Street, Fulham, W. *l.*
- 1889 MACKMURDO, W. G., Aldersbrook, Hermon Hill, Wanstead, Essex. *l.*
- 1872 M'LACHLAN, R., F.R.S., F.L.S., F.Z.S., F.E.S., Westview, Clarendon Road, Lewisham, S.E. (*Hon. member*). *n.*
- 1889 M'LACHLAN, W. H., 8, Trouville Road, Clapham Park, S.W. *l.*
- 1886 MANGER, W., F.E.S., 100, Manor Road, New Cross, S.E. *l, c.*
- 1889 MANSBRIDGE, W., Luther Place, Horsforth, near Leeds. *l.*
- 1888 MARSHALL, A., Sunnyside, Potter's Bar, N. *l.*
- 1886 MATTHEW, Dr. C. M., Wickham Lodge, Trinity Road, Upper Tooting, S.W. *d.*

YEAR OF
ELECTION.

- 1888 MATTHEWS, C., F.E.S., Erme Wood, Ivybridge, S. Devon. *orn.*
 1885 MERA, A. W., 1, Lothian Villas, Capel Road, Forest Gate, E. *l.*
 1881 MILES, W. H., F.E.S., The New Club, Calcutta, India. *mi, b.*
 1888 MITCHELL, A. T., 5, Clayton Terrace, Gunnersbury, W.
 1888 MONTAGUE, C. J., 37, Calabria Road, Highbury. *mi.*
 1880 MONTIERO, SENOR A. DE C., F.E.S., Rua do Alacrine, Lisbon.
 1889 MOORE, H., 12, Lower Road, Rotherhithe, S.E. *l, h, d, e l,*
e h, e d, mi.
 1887 MORRIS, C. H., School Hill, Lewes, Sussex. *l, c, m.*
 1887 NEVINSON, E. B., 7, Staple Inn, W.C. *l, stalk-eyed crustacea.*
 1889 NICHOLSON, W. E., F.E.S., Lewes, Sussex. *l.*
 1889 NOTT, A. W., 75, Waterloo Road, S.E. *l.*
 1886 NUSSEY, B. L., 16, Ramsay Villas, Ramsay Road, Forest
 Gate, Essex. *l.*
 1872 OLDHAM, C., 2, Warwick Villas, Chelmsford Road, South
 Woodford, E. *l.*
 1891 PALMER, J. F., 28, Surbiton Hill, Surbiton, Surrey.
 1892 PANNELL, C., East Street, Haslemere. *l.*
 1890 PEAKE, A. E., Oakfield, St. Nicholas Rd., Upper Tooting. *l, c.*
 1884 PEARCE, A. E., 1, Ildersley Grove, West Dulwich, S.E. *b.*
 1888 PEARCE, J., 4, Borough High Street, Borough, S.E.
 1883 PEARCE, W. A., Wilkinsburg, Alleghany Co., Penna., U.S.A.
l, b.
 1880 PERKINS, V. R., F.E.S., Wotton-under-Edge, Gloucestershire.
l, h, d.
 1888 PERKS, F. E., 111, St. Martin's Lane, Charing Cross, W.C.
zoology, mi.
 1889 PERRY, J. F., Oscott Cottage, Birmingham. *l, c.*
 1889 PICKARD-CAMBRIDGE, H. C., 54, Milton Road, Herne Hill, S.E.
 1887 PORRITT, G. T., F.L.S., F.E.S., Greenfield House, Hudders-
 field. *l.*
 1887 POW, F. E., 43, Choumert Road, Peckham, S.E.
 1886 POWLEY, W., M.A., Whitton Villa, Hounslow.
 1889 RANDELL, G. J., 6, Haycroft Road, Brixton Hill, S.W.
 1888 REID, W., F.E.S., Pitcaple, Aberdeen. *l, continental l.*
 1887 REINDORP, 9, Wordsworth Avenue, East Ham, E. *o. l.*
 1887 RICE, D. J., *Hon. Librarian*, 24, John Street, Bedford Row,
 W.C. *orn.*
 1887 ROBINSON, A., B.A., F.E.S., 1, Mitre Court, Temple, E.C. *l.*
 1888 ROBSON, H., 5, Winterwell Road, Brixton Hill, S.W. *l, b.*

YEAR OF
ELECTION.

- 1888 ROOTS, W., 208, Gt. Dover Street, Borough, S.E.
 1890 ROWNTREE, J. H., Westwood, Scarborough. *l*.
 1887 ROUTLEDGE, G. B., F.E.S., 50, Russell Square, W.C. *l*.
 1891 RUFFLE, G. W., 16, Coleman Road, Camberwell, S.E.
 1887 RUSS, P., Culleenamore, Sligo, Ireland. *l*.
 1890 RUSSELL, S. G. C., 11, Dornton Road, Balham.
 1891 SABEL, E., Linton House, South Side, Clapham Common, S.W.
 1886 SABINE, E., 22, The Villas, Erith. *l*.
 1886 SALWEY, R. E., F.E.S., Peace Wold, Radnor Park Road,
 Folkestone. *l*.
 1888 SAUZÉ, H. A., 4, Mount Villas, Sydenham Hill Road, S.E. *l*.
 1886 SHAW, A. E., F.E.S., Wandsworth Dispensary, S.W. *o*.
 1886 SHELDON, W. G., 15, Alexandra Road, Croydon. *l*.
 1888 SHORT, A., *Hon. Sec.*, 14, Melody Road, East Hill, Wands-
 worth, S.W. *l*.
 1886 SKINNER, G., 31, Motley Street, Wandsworth Road, S.W. *l*.
 1887 SMITH, H. J., 36, Lausanne Road, Peckham, S.E.
 1890 SMITH, W., 4, Hill View Place, Paisley. *l*.
 1890 SMITH, W., 1, Denmark Villas, Albert Road, Teddington.
 1882 SOUTH, R., F.E.S., 12, Abbey Gardens, St. John's Wood,
 N.W. *l*.
 1872 STAINTON, H. T., F.R.S., F.L.S., F.G.S., F.E.S., etc.,
 Mountsfield, Lewisham, S.E. (*Hon. member*). *l*.
 1873 STANDEN, R., F.E.S., 67, Earl's Court Square, W. (*Life*
member). *l*.
 1872 STEP, E., *Hon. Treasurer*, The Mays, Ladbroke Road, Epsom,
 Surrey. *b, m, orn.*
 1892 STEPHENS, A. L., 49, Guildford Road, Blackheath Hill, S.E.
 1888 STEVENS, L., L.C.C., Lower Road, Deptford, S.E.
 1872 STEVENS, S., F.L.S., F.E.S., Loanda, Beulah Hill, Norwood,
 S.E. *l*.
 1886 STOREY, A. T., 19, Margaretta Terrace, Oakley Street.
 1889 STURT, W. T., West House, Queen's Road, Kingston Hill. *l*.
 1892 TAYLOR, E. H., 23, Cromwell Place, West Kensington, W.
 1873 TUGWELL, W. H., Ph.C., 6, Lewisham Road, Greenwich,
 S.E. *l, b*.
 1887 TURNER, H. J., 13, Drakefell Road, St. Catherine's Park, S.E.
l, orn.
 1886 TUTT, J. W., F.E.S., Rayleigh Villa, Westcombe Park, Black-
 heath, S.E. *l*.

YEAR OF
ELECTION.

- 1888 VAUGHAN, H. W. J., F.E.S., 55, Lincoln's Inn Fields, W.C. *l*.
 1887 VERRALL, G. H., F.E.S., Sussex Lodge, Newmarket. *d*.
 1889 VINE, A. C., 38, Temple Street, Brighton, Sussex. *l*.
 1889 WAINWRIGHT, C. J., Hall Road, Handsworth, near Birmingham. *l*.
 1880 WALKER, J. J., R.N., F.L.S., F.E.S., 23, Ranelagh Road, Marine Town, Sheerness. *l, c*.
 1890 WALLACE, G., 6, Borough High Street, S.E. *l*.
 1888 WALLER, R., 273, Clapham Road, S.W. *l*.
 1886 WALSINGHAM, The Right Hon. Lord, M.A., F.R.S., F.L.S. F.Z.S., F.E.S., etc., Merton Hall, Thetford, Norfolk (*Hon. member*). *l, orn*.
 1890 WARD, A., 118, Richmond Road, Brighton. *l*.
 1888 WARNE, N. D., 8, Bedford Square, W. *l*.
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Members will greatly oblige by informing the Hon. Sec. of any errors, additions or alterations in the above addresses and descriptions.

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THE SOUTH LONDON
Entomological & Natural History Society,

(Established 1872)

Hibernia Chambers, London Bridge, S.E.

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Elected January 25th, 1894.

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1892-1893.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY,

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

The Society has for its object the diffusion of Biological Science, by means of Papers and Discussions, and the formation of Typical Collections. There is a Library for the use of Members. Meetings of the Members are held on the 2nd and 4th Thursday evenings in each month, from Eight to Ten p.m., at the above address. The Society's Rooms are easy of access from all parts of London, and the Council cordially invite the co-operation of all Naturalists, especially those who are willing to further the objects of the Society by reading Papers and exhibiting their Specimens.

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COUNCIL'S REPORT, 1892.

THE past year has been an important one in the history of the Society, owing to the number of short papers that have been read, and the Council note with considerable satisfaction that the majority of members exhibiting specimens have accompanied them with notes, which are always of great interest, and often of considerable value.

It is to be hoped that during 1893 this practice will increase, as it adds much to the importance of the exhibit, and greatly assists the Secretaries of the Society in preparing the reports for the Magazines, and also the yearly Abstract of Proceedings.

The Council think that the scientific work done during the year shows that the Society is not standing still, but continues steadily to advance.

As regards membership, in the Report for 1891 this stood at two hundred and twenty-nine. During the past year twelve members were elected, nine resigned, and the names of twelve have been removed from the list. We have also lost three members by death, viz.: Messrs. Stainton, Bouttell, and Vaughan. The Society greatly deplores the loss of all these three gentlemen, but more particularly that of Mr. Stainton, who in the very early history of the Society largely contributed to its success, and who, by the Bye-Laws passed in 1891, was elected an Honorary Member. Although Mr. Stainton did not of late years take an active personal interest in the Society, he was ever willing to help members with advice and assistance in the study of the Lepidoptera.

Twenty-six meetings have been held during the year, and the attendance has been above the average of preceding years.

The Society's financial position, as will be seen from the Treasurer's statement, is highly satisfactory.

It is with regret that the Council find that Mr. Step is

unable to continue the office of Treasurer, and they consider their thanks, together with those of the members, are due to him for the time and attention he has devoted to his duties during the twelve years in which he has occupied this office.

The following additions have been made to the Library :—

“The Entomologist’s Monthly Magazine,” from Mr. MCLACHLAN.

“The Entomologist,” from Mr. SOUTH.

“The Zoologist,” from Mr. NEWMAN.

“The Essex Naturalist,” from the ESSEX FIELD CLUB.

“The Entomologist’s Record,” from Mr. TUTT.

Mr. RICE, the Librarian, owing to his many other engagements, is unable to offer himself for re-election, and the Council are desirous of thanking him for the attention he has given to the Library, and of expressing their regret that he cannot continue to act as the Society’s Librarian.

Mr. WEST the Curator, to whom the Society’s gratitude is specially due, for having so thoroughly re-arranged the Collections, stands for re-election. There is still much to be done by members to render the Collections anything like complete, and an appeal is made to all members who have duplicates, to communicate with Mr. West, and see what they can do towards assisting him by donations of species which are wanting.

Messrs. J. JENNER WEIR, C. G. BARRETT, and H. MOORE have made donations to the Cabinet.

The Excursions during the year were as follows :—

June 6—Bromley, Kent.

Conducted by Mr. C. S. Cooper.

June 18—Oxshott, Surrey.

Conducted by Mr. R. South.

July 16—Darenth Wood, Kent.

Conducted by Mr. Auld.

September 24—Ashted Woods, Surrey.

Conducted by Mr. E. Step.

The Council consider that the thanks of the Society are due to those gentlemen who so kindly undertook the charge of the various excursions.

The Proceedings for 1890 and 1891 are just issued, and the Council regret the delay which has taken place in bringing these out. With regard to the Proceedings for 1892, the whole of them are in MSS., and the Committee report that they have been approved up to the end of April. It is anticipated that they can be issued at an early date.

The Annual Exhibition was held on the 5th and 6th May ; and although not financially satisfactory, was otherwise a great success. It is estimated that the probable loss will amount to about £5, and to cover this there is a guarantee fund of upwards of £60.

The Annual Dinner, which was held on the 9th February, was well attended, and the thanks of the Dinner Committee are tendered to those of the members and their friends who so ably assisted in carrying out the musical and other necessary arrangements.

The Council, in conclusion, wish to add that they look forward with confidence to the year 1893. Mr. J. JENNER WEIR has undertaken, if elected, to act as President ; and it is anticipated that the year will be one that will long be remembered in the history of the Society.

H. W. BARKER,

Hon. Sec.

THE SOUTH LONDON GEOLOGICAL AND NATURAL HISTORY SOCIETY.

BALANCE SHEET FOR THE YEAR 1892.

GENERAL FUND.

[illegible]

LIBRARY FUND.

| <i>Receipts.</i> | <i>£ s. d.</i> | <i>Expenditure.</i> | <i>£ s. d.</i> |
|--------------------|----------------|---------------------|----------------|
| To Balance in hand | | By Expenditure | ... .. |
| „ Donation | | „ Balance in hand | ... .. |
| | | | |
| | | | £4 1 9 |

PUBLICATION FUND.

| <i>Receipts.</i> | <i>£ s. d.</i> | <i>Expenditure.</i> | <i>£ s. d.</i> |
|------------------------------|-----------------|-----------------------|-----------------|
| To Balance in hand ... | ... 2 1 9 | By Balance in hand... | ... 22 12 3 |
| " Donations ... | ... 0 10 6 | | |
| " Vote from General Fund ... | ... 20 0 0 | | |
| | <u>£22 12 3</u> | | <u>£22 12 3</u> |

ASSETS & LIABILITIES.

| <i>Assets.</i> | <i>£ s. d.</i> | <i>Liabilities.</i> | <i>£ s. d.</i> |
|---|----------------|---|----------------|
| To Balance in General Fund ... | ... 31 18 11 | By Rent, due Christmas ... | ... 6 5 0 |
| " " Library Fund ... | ... 4 0 9 | " Printing ... | ... 2 6 0 |
| " " Publication Fund ... | ... 22 12 3 | " Balance of Postage a/c due to Secretary ... | ... 2 4 0 |
| " Proportion of Arrears due (total £31 15 6)... | ... 11 8 6 | " Probable Cost of "Proceedings" 1890-91 ... | ... 44 10 0 |
| | <u>£70 0 5</u> | " Balance of Assets ... | ... 14 15 5 |
| | | | <u>£70 0 5</u> |

Examined, compared with Books and Vouchers, and found correct, *January 23rd, 1893.*

JOHN HENDERSON, } *Auditors.*
ROBERT ADKIN, }

PRESIDENTIAL ADDRESS, 1892.

GENTLEMEN,

There is a duty always imposed upon the President of a Society such as this, which, if he were a particularly modest man, would almost make him pause before accepting the office, were it not for the wise and prudent arrangement by which the duty is deferred until the term of office has expired. It is the duty of delivering a Presidential Address !

Not that I wish to suggest that there is any difficulty in addressing you, when some subject of immediate interest is before us—some rare capture or possible novelty, or some observation in Natural History of special interest ; but to draw up an Address, while conscious how often the same thing has been done before—and how well—is a very different undertaking, the trouble being to find words or subjects which shall have some sort of fresh and living interest, and be something more than a mere hash-up of trite and well-worn material.

Always new, and always interesting, are the discoveries and observations of the season immediately passing, and this fact enables me to place in the fore-front of my remarks the work which has been done this last year in more perfectly recording and figuring earlier stages of the larvæ of our British butterflies, not only because the butterflies are perhaps the most generally attractive of all insects, but because the work has been accomplished almost wholly by members of our own Society. To our friends, Mr. Frohawk, Mr. Hawes, and Mr. H. Williams, is due the credit of greatly increasing our knowledge of such species as *Colias hyale*, *C. edusa*, *Polyommatus ægon*, *Hesperia linea*, *Hesperia lineola*, and *Cyclopides paniscus*, and in at least one instance a gross and oft-repeated error has been corrected.

Valuable contributions have also been made to our knowledge of structure in the earlier stages of *Acronycta*, *Cerura*, and other genera, by Dr. Algernon Chapman.

In actual novelties the year has been comparatively barren, a condition of things which has previously been noticed to occur when the more brilliant and striking day-flying species have been, as in the past year, unusually abundant. In

Lepidoptera we have had announcements of two interesting species—*Syrichthus alveus* and *Hercyna phrygialis*—captured many years ago, but only recently recognised; and also the results of long and careful study by Dr. J. H. Wood of a small and very difficult group in the genus *Coleophora*, whereby four species—*Coleophora alticolella*, *C. glaucicolella*, *C. sylvaticella*, and *C. agrammella* have been added to our list. In consequence of the researches of Mr. R. H. Meade and others, in recent years, the results of which have now been published, a large number of species of Diptera have been shown to be British, which were previously unrecorded; Hemiptera too have been fairly represented, and a very few novelties have been met with in Coleoptera, Hymenoptera, and Neuroptera; but particulars are doubtless familiar to you in the Magazines, and I will not take up your time by an enumeration.

An advance in another direction, by one of our more experienced members, should certainly not be passed over unnoticed. Mr. Elisha has introduced to us a novel method of laying out cabinet drawers, whereby, not only is the series of the perfect insect in each case exhibited with, where possible, the habitation of the larva, but, in addition, a label, giving with exquisite neatness and brevity, a history of the species as far as known.

A discovery made outside our Society is, I think, so important that it should not be passed over in silence. I refer to that by Dr. J. H. Wood, of the habit of the larva of *Brachyania woodiana*, which he has found to feed on—or rather in—mistletoe, entering the leaves and hollowing them completely out, in a manner very unusual in a Tortrix.

A subject which must not be ignored in an address of this nature, yet which cannot be approached without sorrowful feelings, is that of the losses which the Society has sustained by death. No greater bereavement has ever fallen upon students of Entomology, since the subject has been studied in this country, than has befallen us in the death of Mr. H. T. Stainton. For thirty years past we have acknowledged him as our leader in the study of Lepidoptera—more especially in that of the large and difficult group of the Tineina. His Manual of “British Butterflies and Moths” has been the chosen companion of everyone who desired to have an intimate knowledge of British Lepidoptera. His “Natural History of the Tineina” and the “Tineina” volume of the “Insecta Britannica” are standard works of high excellence. The “Intelligencer,” which he conducted, was the organ of young

entomologists over thirty years ago, and the parent of the more elaborate magazines which have since taken its place; his "Entomologist's Annual" for twenty years kept us supplied with information of the work done each year; and to the time of his decease he was a leading spirit in the management of the "Entomologist's Monthly Magazine."

Another well-known face has disappeared from among us in the decease of Mr. Howard W. S. Vaughan. Recently he has not been much among us; but those of us who can call him to mind as a young, witty, clever entomologist, keen and skilful, and with the quickest insight and faculty for working out difficult species, know well of what valuable work he was capable.

Another loss which we lament is that of Mr. C. S. Bouttell; who was, I think, better known to most of you than to myself.

But we will turn from the sad subject of our losses to the hopeful future. We had last year what must emphatically be pronounced a rich and abundant year in respect of many interesting species—some of very uncertain occurrence. We have now had what is always held to be favourable to our work, a fairly severe winter, which indeed may not yet be over; and we look for good results—a season in which the outdoor worker will be encouraged by much success, and in which opportunities will be afforded him of increasing our stock of knowledge. In this connection I have thought that you might be interested by a few details which have come under my own observation on a subject, certainly not new, but as yet not fully worked out. It is that of *protective mimicry in Lepidoptera*. A great deal has been written upon it as observed in species inhabiting distant regions, and conclusions surprising in their nature and their method have, at times, been deduced from it; but as a quality belonging to Lepidoptera in general, or, at any rate, to a large proportion of the species, it has hardly received sufficient attention. Yet it is so obvious that the specific names of the large majority of the species in one very important and interesting group of moths have actually been clearly dictated by it, though the applications have not perhaps always been in the happiest taste. I refer, of course, to the group which we call "Clearwings"—the Sesiidæ or Trochiliidæ—and although *S. culiciformis* is not especially like a gnat, nor *S. formiciformis* very similar to an ant, nor the name *S. ichneumoniformis*, which might so happily have been given to either of them, particularly suitable to the species to which it is really attached, nothing can be more suitable than the name of *S. crabroni-*

formis for a species which, when sitting upon a tree, will not only look exactly like a hornet, but actually raise its abdomen in a most menacing manner as though prepared to sting on the smallest provocation. The resemblance in all the species of this group to species of Hymenoptera is indeed most wonderful.

Scarcely less striking and interesting is the imitation of dead leaves by the various species of stout-bodied Bombyces of the genera *Gastropacha*, *Odonestis*, *Lasiocampa*, *Eriogaster*, etc., when at rest. What can be more remarkable than a sitting specimen of *Gastropacha quercifolia*, with antennæ closely tucked away, the costa of the fore-wing on each side forming, apparently, the midrib of the brown leaf, of which the veins are represented by the brown nervures of the fore-wing on the one side, while the protruding "lappet" of the hind-wing finishes off the other side of the leaf. Little less accurate in the resemblance to a paler leaf is a female *Odonestis potatoria* when she elects to hang from a grass blade under a hedge; while in the case of the rare *Gastropacha ilicifolia* it is notorious that the captor of the first British specimen would not have seen it at all had he not fortunately knelt down close to it to pin a small *Tortrix*; then he noticed that what appeared to be a dead leaf was altogether too symmetrical, and was in fact a living and most lovely moth.

The close resemblance of *Hemerophila abruptaria* to the paling on which it loves to spread itself flat, like a chip, has also been noticed, and the general likeness of many of the *Eupitheciæ* to weather-stained palings and the bark of trees, has not escaped observation; though it is not perhaps very generally known that many of them may be found in plenty, if the eye is keen enough to discern them, on the underside of branches of trees, squeezed close to the bark, and hardly distinguishable. The accurate adaptation of various *Noctuæ*, of *Geometræ* of the genera *Cleora*, *Boarmia*, *Tephrosia*, *Cidaria*, and others, and of *Pædisca*, *Phlæodes*, etc., among the *Tortrices*, to all sorts of positions on tree trunks and branches, is familiar to us all; while many *Tortrices* of the genera *Penthina*, *Antithesia*, *Spilonota*, *Halonota*, etc., have actually received the nick-name of "bird's-dung *Tortrices*," from their extraordinary resemblance to the excrement of birds.

My present intention is not so much to draw attention to the well-known general resemblances, as to point out special cases in which the actual imitation is peculiarly close, or where from a singular harmony of colour and marking, an effect is produced, deceptive to the eye, which would not, from the

appearance of the insect when expanded or when moving, be expected or even believed possible, but which supplies that fitness to its surroundings which seems to afford any living creature the greatest security while in absolute repose.

Taking first that most unpleasant phase of mimicry—that to the excrement of birds—it is certain that no one who had not closely observed them while at rest, would believe the extraordinary resemblance, not only in the genera already enumerated, but in *Phittheochroa rugosana* when sitting on a leaf of *Bryonia dioica*, *Peronea variegana* on a hawthorn leaf, or *Eupæcilia nana*, perched on the extreme tip of a jagged piece of birch bark, to the party-coloured droppings of various species of small birds. *Cilix spinula*, with its wings shut closely together clasping the body, may readily be passed over for similar material, and so may *Acidalia rusticata* when closely appressed to an elm leaf at the bottom of a hedge, and the likeness of a pair of *Leiocampa dictæoides*, with their well-clothed legs extended on the low expanded portion of a birch trunk, to the smooth dropping of a large bird, must be seen—as I have seen it—to be comprehended. But we may go even further than this. In open woods the trees are often tenanted by numerous ringdoves (*Columba palumbus*), and the brambles, dogs-mercury, and other plants growing underneath, have their leaves plentifully splashed with the white fluid ejected by the young birds. In the more northern woods, *Abraxas ulmata* sits upon the leaves in the same places, and the manner in which its white colour and clouded grey and brown spots harmonize with the splashes in question, is wonderful.

The trunks of oak trees in woods are plentifully ornamented with tufts of lichen, divided into innumerable branchlets; or with patches of other lichens, white or grey, generally much mixed with moss. Here *Chariptera aprilina* is hardly distinguishable from a tuft of lichen, even *Liparis monacha* may readily be passed over in the same way, and it is actually impracticable to see *Leptogramma literana* and *Sarrothripa revayana*. They become visible when blown off. *Psoricoptera gibbosella* is equally invisible when the oak trunk is fairly clear of lichen, its raised scales and peculiar arrangement of colour harmonize precisely with the bark; and it is most amusing when scrutinizing an elm trunk, to see a *Gelechia fugitivella* suddenly move from a chink in which it had been quite undistinguishable, run to another, and disappear. *Nola confusalis* sits head downwards on a projecting piece of bark, and seems to be a bit of white lichen; and *Erastria fuscula* nestling

closely to a fir trunk presents, with its white dorsal blotch, a most striking resemblance to another. Perhaps one of the most curious and unexpected cases of resemblance to a lichen is that of *Ceropacha flavicornis*. It makes its appearance while the birches are bare of leaves, and sits conspicuously on the stems, or preferably on the dividing branches, or even twigs, of the birch bushes. At the same time there is upon the same birch bushes a pretty grey lichen in small patches and in perfect growth, and the moth is of precisely the same colour, and has, at the sides of its thorax, a crest of raised tufts of scales which enhances its resemblance to the lichen in an extraordinary degree. *Xylocampa lithoriza*, which sufficiently resembles a patch of grey lichen on a tree trunk, harmonizes even better with the grey limestone, of which the "jambs," which support the gates, are built, in the far west, and these are, there, its usual resting-places.

Although the general resemblance of Bombyces of a certain group to dead leaves, already adverted to, is too well-known to require detailed notice, I must mention one case of special mimicry. I was walking down one of the country roads at Norwich some years ago when I noticed a batch of eggs of *Eriogaster lanestris* on a hawthorn twig, looking particularly velvety and exquisitely arranged; so I picked the spray to carry it home, and had carried it several hundred yards before I discovered that an apparently dry hawthorn leaf drawn closely to the stem just below the eggs, was really the living female moth, still clinging to the place on which she had so carefully arranged them. And I do not regard this as mere carelessness on my part, for the posture, the colour, the brown band, even the white spot, harmonized in so extraordinary and unexpected a manner with its position and surroundings, that even after I had discovered the creature I was amazed at the deception.

In quite a different style *Cirrhaedia xerampelina*, when sitting among the short grass at the foot of an ash tree, may readily be passed over for a hawthorn leaf in an earlier and brighter stage of fading, *Selenia illustraria* and *S. lunaria*, sitting with angular richly-clouded wings half erected, are hardly to be distinguished from fallen leaves. *Drepana falcula* and *Brephos parthenias* on the twigs of a birch tree equally resemble withered brown birch leaves, *Lophopteryx camelina* sitting on an elm leaf, with curious thoracic crest, and prominent tuft, and its wings closely drawn together, seems a mere dried rolled-up elm leaf, or a pair of the same species, when fallen from an overhanging tree on a frond of bracken,

is actually indistinguishable from a mass of fallen brown flower-scales of *Pinus sylvestris*. *Ennomos angularia* and its nearest allies, which often hang from a branch or twig of a tree, or sit on its trunk with wings nearly erect, are exactly like fading yellow leaves; while *Smerinthus tilia*, on a lime trunk, takes precisely the posture and angular appearance of the two lowest leaves on one of the small twigs which so often grow out of the bark.

Another strong general protective resemblance, but which has not been so much remarked, is that of very many of the fen and marsh frequenting moths to the withered and dry portions of the plants among which they conceal themselves. *Nonagria typhae* is of exactly the colour and appearance of the dead brown leaves of *Typha latifolia*; *N. neurica* is a mere knot on the stem of a reed; *Leucania straminea*, *L. pallens*, *L. impura*, *L. obsoleta*, *L. phragmitidis*, *Senta ulvæ*, *Meliana flammea*, *Nonagria lutosæ*, *Chilo phragmitellus*, *C. mucronellus*, *C. gigantellus*, are so like the dead leaves, stems, and sheaths of reed, sedge, and coarse grasses that, common as some of them are, they are rarely found when at rest. I remember once turning up the overhanging leaves of a large tufted sedge, and being quite struck by the admirable manner in which a *Leucania straminea*, which was sitting on the coarse stem, harmonized with its surroundings. *Leucania littoralis* and *Anerastia lotella* are well concealed by their likeness to the dead sheaths of *Ammophila arundinacea* among which they hide, as is *Tapinostola elymi* among *Elymus arenarius*, and indeed *Agrotis ripæ* and *A. cursoria*, among the same two plants, are not at all conspicuous.

Several species attached to the common heather (*Calluna*) resemble it in a most curious manner in different stages of its growth. In spring and early summer every sprig bears the dead and dry calyces of the flowers of the preceding autumn. They are arranged in two parallel rows. At this time *Fidonia atomaria* swarms on the heaths; and when at rest with depressed wings, whether male or female, lighter or darker, it bears a most singular resemblance to the double row of withered blossoms. Its somewhat tessellated markings, although not apparently at all similar, harmonize with the dead blossom twigs in a manner that must be seen to be appreciated. But it is even more curious to see that *Peronea mixtana* and *Cnephasia politana* (*lepidana*), both of which are out (hybernated) at the same time, and which do not greatly resemble one another, and are not in the least like *F. atomaria*, when sitting imitate these old flower spikes even

more accurately. But in July and August when the heather is bright with blossom, it is frequented by *Agrotis porphyrea* and *A. agathina*, both of which may easily be passed over for a sprig of fresh blossom. At the same time *Gelechia ericinella* exactly simulates in colour and markings the double row of tiny leaves on a very young shoot. In much the same way *Trachæa piniperda* and most of the Tortrices of the genus *Retinia* imitate the colour and appearance of the scaly red shoots of fir; while *Tortrix ministrana*, *Catoptria albersana*, *Ptycholoma lecheana* and *Pyrodes rhediella* are hardly to be distinguished from the brown capsules or sheaths which fall in abundance from the buds of trees in the early summer. Other species take the form of a bit of stick—*Pygæra bucephala* when hiding on a grassy bank at the foot of a hedge, is a most evident piece of grey stick with rounded patches of yellow lichen upon it; *Ptilodontis palpina*, with the long projecting points of its porrected palpi, "prominent" dorsal scales, and long anal tufts is hardly distinguishable from a broken bit of dry bramble stick, with jagged ends and the thorns still attached; and *Nephopteryx genistella*, when resting on a brown stick of furze, with wings clasped closely down, its head stiffly raised and finished off with a brush of stiff erect scales, and the slight fascia across the wings resembling a joint, looks like nothing else than a dead and broken twig. *Calocampa exoleta*, when sitting on ivy bloom or at sugar on a tree trunk, with wings folded and wrinkled close to its sides, is also a mere stick, and so is its congener *C. vetusta*; but perhaps the most startling resemblance is that of *Cucullia verbasci* to the dead thorn branch, upon which it sometimes spends the day, in a hedge, close to its food plant. The harmony of its crested thorax, extended legs, and longitudinally-striped wings, with the dead wood, is exquisite. Another curious resemblance is that of *Cossus ligniperda* to a piece of chip. When sitting at the top of a paling, with head and thorax raised to the utmost by the stiff strong fore legs, and wings pressed closely to its body, it appears to be a piece of the grey wood split away and turned back. Similarly when *Batrachedra præangusta*, driven by the wind from its beloved poplar-tree, takes refuge on a fence, holding itself stiffly erect, it appears to be a tiny splinter weathered off; and when seen thus sitting in scores, the paling appears rough with small raised filaments. *Melissoblaptes cephalonica*, when at rest on the beams and wooden supports of a fruit warehouse, with head thrown stiffly back, can scarcely be distinguished from a splinter; and the same, in some degree,

may be said of the grey species of the genus *Ephestia* which frequent similar situations. *Plodia interpunctella*, however, when sitting in the same posture on the wall of a grain warehouse, looks like a black oat-grain stuck there, the sudden change of colour in the middle of its wings giving the effect of the reflection of light on the glossy surface of the grain. Outside the corn warehouses little bits of yellow husk or chaff sometimes seem to be sticking about, but on close inspection reveal themselves as *Gelechia cerealella*.

The, apparent, bit of goose-down entangled with a hawthorn twig, is often *Liparis auriflua*, the long loose downy scales in its dorsal margin greatly aiding the deception. *Orgyia pudibunda* hanging to a leaf, with fluffy legs outspread, or on the ground under a hedge, may easily be passed over for a large female sallow catkin, bursting with ripe seeds; while a *Cerura vinula*, or better still, a pair of the same, sitting on a plant of dwarf sallow (*Salix fusca*) is even more admirably concealed by its likeness to a spike of catkins with fluffy seeds bursting out all round.

The resemblance of *Anthocharis cardamines*, when at rest, to a leaf of wild chervil has very recently been commented on, but few seem to have observed its still more curious likeness to a bunch of the buds of its usual food plant, *Cardamine pratensis*. It loves to sit on the flower spike, hanging from the unopened buds, and the peculiar arrangement of its green markings harmonizes most curiously with them, producing a deception which is heightened by the effect of a slight tinge of altered colour produced by the orange patch shining through the green. This resemblance is a case of effect rather than actual likeness, and should be seen to be appreciated. Much more easy is it to understand that *Colias edusa* and *C. hyale* when at rest with closed wings, on a clover leaf, appear to be faded yellow leaves of the clover, a deception heightened by the rust-like round spot on the middle of the hinder wings beneath. Everyone, too, is familiar with the fact that when *Satyrus semele* alights suddenly upon a bare place on a heath or hill side, instantly closing its wings and sloping them over sideways, it becomes indistinguishable from the ground on which it rests; but not everyone is aware that when *Vanessa c-album* floats down upon the ground in a sunny glade and closes its wings, it becomes precisely like a fallen decayed oak leaf, and if the weather becomes cloudy it will lie down on its side, and so complete the deception. Another curious resemblance is that of the beautifully tessellated hind-wings of *Argynnis euphrosyne* and *A. selene*

to the flower heads of *Luzula*, *Bromus*, *Dactylus*, *Festuca*, and other grasses on which they are fond of sleeping.

One day, a few summers ago, I was collecting along a row of trees backed by a hedge, looking for insects which might be sheltering from a violent storm of wind which had sprung up; and was greatly interested to notice that some little bushes of *Populus alba* (springing, as they always do, from the roots of the trees) were chosen as resting-places by the hosts of *Pieris brassicæ* and *P. rapæ*, which were unable to face the wind. Here, sitting on the white undersides of the leaves, they were safe from notice, until beaten out in dozens at a time.

One of the most extraordinary cases of mimicry that I know of, is between *Chesias spartiata* and the dead dry pods of its food plant, the common broom (*Cytisus scoparius*). The pods when ripe split down the front, drop their seeds and spread open wide, so as to become nearly flat, showing the rounded hollows which the seeds have occupied. The moth sits on the broom bushes in the evening, with its wings hanging in precisely the same posture, and of much the same dark colour, and actually has, in a line, obliquely, on each fore wing, *three oval markings* of ringed appearance, and of the size of the hollows in which the seeds have lain. Mimicry could hardly go further than this, yet it is almost exceeded in oddity by that of *Laverna phragmitella*, which, when sitting on the old seed head of *Typha latifolia* from which it has just emerged, looks exactly like one of the little tufts of pappus which burst out and lie upon the surface of the over-ripe seed head, the lines and ocellus on the fore-wings completing the deception; and again by *Coleophora annulatella*, which, when swept up, and sitting on the side of the net, is hardly distinguishable from the two-awned husks of *Bromus sterilis*, which, growing among its food plant, *Chenopodium*, get swept into the net at the same time.

An interesting case of adaptation, rather than of actual resemblance, is that of *Coccyx strobilella* to the tips of the scales of the spruce fir cone from which it has just emerged. The colour is totally different, but the scale has strong curves at the apex, and the moth sits in them so closely as to harmonize with the *shadow* of the curve. On the other hand, a most unaccountable case of resemblance is that of *Gelechia senectella*, in a marsh in which it is common, to a small Hemipteron which is plentiful at the same place. Both are of the same size, shape and colour, and, after sweeping, it is not easy to distinguish in the net, which is a moth and which

a bug. A different case is that of *Myelois cribrum*, which, especially a small male, when at rest with closely clasped and almost rolled up wings, and sitting snugly on a thistle leaf, appears to be nothing more than a sheltering specimen of the common *Hyponomeuta cognatella*, which, however, does not appear to be found anywhere near its chosen localities; and that of *Gelechia longicornis*, of which the different varieties seem to simulate *Pempelia adornatella*, *P. subornatella*, and *P. porphyrella*, species with which it surely would *never* be found associated.

The subject of larval resemblance is so large a one that I will not attempt to deal with it here, further than to notice a few curious cases of *special* resemblance, which have forced themselves on my attention. Everyone knows the pretty larva of *Cleora lichenaria* and how accurately it resembles the particular bunch of lichen among which it may be feeding, but I think that not everyone has seen the larva of *Anthocharis cardamines* feeding on *Hesperis matronalis*, and observed that it is precisely like the seed pod of the plant, the whitish line down its sides accurately representing the line of reflected light down the side of the glossy seed-vessel. The larva of *Gonepteryx rhamni* is not a conspicuous object as it lies along the mid-rib of a leaf of *Rhamnus frangula*; nor is that of *Trachæa piniperda* among needles of Scotch fir, which from its dark green and white longitudinal lines, it closely simulates; nor that of *Anarta myrtilli* on a heather twig, with crossed white markings, making the green interspaces appear to be leaves; nor that of *Eupithecia pimpinellata* when it has eaten off a section of an umbel of *Pimpinella magna*, and, taking its stand on one of the rays, becomes a mere stiff continuation thereof. The dark larva of *Biston hirtaria*, on the trunk of a London lime tree, is apt to look exactly like a short bit of dirty string, for which the sparrows must surely mistake it, or they would hardly neglect such a luscious morsel. But I think that the most remarkable case of larval mimicry which I have seen is that of a *Eupithecia extensaria*, which feeds on *Artemesia maritima* (sea wormwood). The stems and leaf-stalks of the plant are furrowed and clothed with white down in such a manner that all appear striped with alternate green and dull white, and this larva is similarly ornamented with longitudinal stripes of the same colours and of the same width; the young flower-buds of the plant are tipped with brown, and the front of the head of the larva is coloured in the same manner; the segments of the leaves are somewhat tumid at the tips, and the anal legs or claspers of the larva

are swollen or rounded into precisely the same shape. This last adaptation would appear superfluous if it were not for a curious trick which this larva has, at times, of raising its posterior end stiffly out while holding on by its thoracic legs—thus, apparently, standing on its head.

I have touched the fringe of the subject. Other cases of similar adaptation will occur to most of you. It is worthy of notice that these resemblances are usually effective only when the insect is perfectly still and at rest, and are useful for concealment only when it cannot look out for its own safety. The general belief is now, that natural selection has produced these effects. To my own mind this solution demands too large an amount of credulity, but I do not propose to go into this subject here.

An abundance of additional information on this interesting subject will be accumulated if the members will notice and record similar observations on protective resemblance whenever they may meet with them.

My remarks have run to some length—I could not cut them very short.

In resigning the post of your President to my respected successor, Mr. J. JENNER WEIR, I beg to thank you all for support and kindly assistance given throughout my term of office.

CHAS. G. BARRETT.

ABSTRACT OF PROCEEDINGS.

JANUARY 14th, 1892.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

Mr. A. Harrison, F.C.S., F.R.M.S., was elected a member.

Mr. R. Adkin exhibited specimens of *Sesia ichneumoniformis*, Fb., bred from roots of *Lotus corniculatus*, L., obtained on the Sussex coast. Mr. Tugwell remarked that the larva of *S. ichneumoniformis* was generally supposed to feed on the common bird's-foot trefoil (*Lotus corniculatus*, L.), but it had also been reported as occurring in the roots of hellebore; the species had frequently been bred by Mr. Salvage of Brighton, who was one of the earliest to discover the larva. Mr. South said that the elder McArthur was the first to find the larva of this species in the roots of *Lotus*, and he, at one time, obtained it in considerable numbers.

Mr. Adkin also exhibited three specimens of *Eurhrypara urticata*, L., taken at Lewisham, on one evening during the past summer: two of them were normal, but in the third the marginal shading was united with the inner band, thus forming a broad black border to all the wings. Mr. South remarked that he had captured and examined a great many examples of this species, but he had never obtained anything approaching the variety exhibited.

Mr. J. Jäger exhibited two modified examples of *Vanessa antiopa*, var. *hygiea*, Heyd., bred by Mr. William Werner, of Biedenkopf, Germany, and remarked that in one specimen the yellow border obliterated the dark band and blue spots on the primaries, whilst the secondaries were normal; in the second specimen the yellow border, which was much suffused with black, broadened out considerably, and entirely absorbed the dark band and blue spots on all the wings.

Mr. Weir said that he had received a great many specimens of *V. antiopa*, from Hudson's Bay, and considered it singular that the species should occur so far north, especially as snow was on the ground during eight months of the year.

Mr. Tugwell exhibited some dark specimens of a species of *Eupithecia* which had been sent out by Paisley collectors for some years past, and which was generally known as the

"Paisley pug." He said that when he exhibited these insects on a former occasion (Abst. Proc., 1890, p. 60) he was then disposed to consider them referable to *E. satyrata*, whilst Mr. Tutt and others were of opinion that they were dark examples of *E. virgaureata*. He had recently received pupæ of the insect in question, and having compared them with pupæ of *E. castigata* he had now come to the conclusion that the so-called "Paisley pug" was a melanic form of that species. If the imagines were examined in different positions the characteristic linear markings of *E. castigata* could be clearly traced. Referring to *E. virgaureata*, Mr. Tugwell said that he had ascertained from local collectors that that species did not occur in the Paisley district, and that golden-rod, the food plant, which was extremely rare in the neighbourhood, did not exist at all in the particular locality where the dark *Eupithecia* were taken. Mr. Barrett thought that absence of golden-rod had very little bearing on the question, as the larva of *E. virgaureata* would feed on several other plants; from an examination of Mr. Tugwell's melanic specimens, however, he was inclined to consider them referable to *E. castigata*. At Cannock Chase he had found *E. castigata* in profusion on the boughs of oak trees, and a large proportion of the specimens were nearly as dark as the examples under discussion, whilst others gradated between that form and the type.

JANUARY 28th, 1892.

ANNUAL GENERAL MEETING.

W. H. TUGWELL, Esq., Ph.C., *President*, in the Chair.

The Council's and Treasurer's reports were read, and the Officers and Council for the year were elected as under:—

President.—Mr. C. G. Barrett, F.E.S.

Vice-Presidents.—Mr. J. Jenner Weir, F.L.S., F.Z.S., F.E.S., and Mr. R. South, F.E.S.

Hon. Treasurer.—Mr. E. Step.

Hon. Curator.—Mr. W. West.

Hon. Librarian.—Mr. D. J. Rice.

Hon. Secretaries.—Mr. H. W. Barker, F.E.S., Mr. A. Short.

Council.—Messrs. T. R. Billups, F.E.S., J. T. Carrington, F.L.S., C. Fenn, F.E.S., F. W. Frohawk, F.E.S., J. Henderson, W. H. Tugwell, Ph.C., J. W. Tutt, F.E.S.

Mr. Tugwell, the President, read his retiring address.

FEBRUARY 11th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. Jenner Weir exhibited specimens of the following species of the genus *Cymothœ*, viz.: *theodota* ♂ et ♀; *æmilius* ♂ et ♀; *cænis*, ♂ et ♀; *theobene*, ♂ et ♀; and stated that this genus was remarkable for the extreme sexual difference; the males in most cases were of an ochreous or cream colour, more or less clouded with black; while, on the other hand, the females rarely had any of the ochreous or cream colour, and their markings were very varied and presented a very spotted appearance, for instance, the male of *Cymothœ theodota* was a rich buff colour, the wings towards the base being lighter, almost cream coloured, the upper wings narrowly and the under broadly edged with black; the female had the upper wings black, with twenty-three white spots, the base somewhat bluish, the under wings were almost white on the disc, with a bluish base and lower edge, the ochreous colour being confined to two spots near the anal angle, the margin of the wing was broadly edged with black containing a double row of white spots.

In *Cymothœ æmilius* the male had the upper wings at the base and extending over half the surface, of a rich dark chocolate, the distal half being ochreous; in the female of this species there was not a trace of the ochreous or chocolate colour, but the wings were black, a white band edged with blue, common to both wings, and submarginal and marginal series of spots of the same coloration. It was not necessary to describe so fully the difference between the sexes in the other species; it would suffice to say, that, the general colour of the male *Cymothœ theobene* is buff and chocolate, and of the female a dusky brown and dull white. The male of *Cymothœ cænis* is cream-coloured, with a marginal row of white spots surrounded with black, while the female is of a dull blackish colour, with a white irregular band common to both wings.

"It will be seen," he said, "that the two former species dealt with have females more conspicuously coloured than the males; whilst the two latter species have the females much duller in colour than the other sex. It is difficult to realize that it is probably a fact that both kinds of coloration are equally protective.

"Take the apparently very conspicuous females of the two species of *C. theodota* and *C. æmilius*, it might be thought that when under a tropical sun these females rested on a twig or leaf that they would be plainly visible to their

enemies the birds; but this probably is not so, the breaking up of the colour of the wings into bands and spots it seems causes them to be far less conspicuous than if they were as unicolorous as the males. I am led to believe that this is the case, from the fact that so conspicuously coloured an animal as the zebra is by no means easily seen in its native haunts, as testified to by Mr. Francis Galton and Professor Henry Drummond, the latter observing: 'The black and white somehow take away the sense of a solid body altogether, and the two colours seem to blend into the most inconspicuous grey. I have found myself in a forest gazing at what I supposed to be a solitary zebra, its presence betrayed by some motion at my approach, and suddenly realized that I was surrounded by an entire herd, which was all invisible till they moved.' If this was so in such a large animal as a zebra, it becomes easy to understand how it might be the case in an insect with an expanse of wings of about four inches.

"But it might be asked, how do you account for females of *C. cænis* and *C. theobene* being inconspicuously coloured, the reply is, that, judging from the habits of an allied species in South Africa, viz., *Cymothoe alcimeda*, which is stated to frequent woods only, and is fond of settling on damp mud, the dull, I might almost say, mud colour, of the two females of the species in question, would bear a protective resemblance to the prevailing hue of their environment."

Mr. Austin of Folkestone exhibited an extremely rare form of *Lycæna bellargus*, Rott., having the brilliant blue colour entirely suffused with black scales, and another example with beautiful markings on the upper surface: both specimens were captured at Folkestone. Mr. Weir pointed out that the first example partook somewhat of the colour of the female.

Mr. Tutt exhibited a bred series of *Hadena pisi*, L., varying from grey to a deep purplish red; three specimens of *H. dissimilis*, Knoch., one fairly marked with longitudinal striations; three specimens of *Cerastis vaccinii*, L., one having the outer margin curved as in *C. ligula*, Esp., = *spadicea*, and remarked that it was very rarely that this species varied in the shape of the wings.

Mr. R. Adkin exhibited smoky varieties of *Nemeophila plantaginis*, L., from Sussex.

Mr. Farren exhibited *Peronea schalleriana*, L., var. *latifasciana*, Haw., and *P. variegana*, Schiff., var. *cirrana*, Curt., from Scarborough, also *Elachista subocellea*, St., from Cambridge.

Mr. T. R. Billups exhibited a larva found feeding on a tomato, from Teneriffe, which Mr. Tutt said was probably *Prodenia littoralis*, B.

Mr. Herbert Williams exhibited a dark variety of *Calymnia trapezina*, L.

Mr. J. Jenner Weir read a paper on *Pieris napi*, L., and allied forms considered by some entomologists to be distinct species or sub-species, and by others mere local varieties (*vide* p. 63).

Mr. Wallis Kew read a paper on "The Dawn of Memory in the Animal Kingdom."

FEBRUARY 25th, 1892.

C. G. BARRETT, Esq., F.E.S. *President*, in the Chair.

Messrs. J. W. Larkin and A. L. Stephens were elected members.

Mr. Robert Adkin exhibited Lepidoptera from the Scilly Isles, and contributed the following note:—"In June of last year my brother, being on a visit to the Scilly Isles, very kindly captured and sent to me, in a damp box, such species of Lepidoptera as he was able to obtain in the time at his disposal. Unfortunately, owing to some delay in the box reaching me, many of the insects had been attacked by mould; but I was able to rescue some few before they were entirely spoiled. These were,—*Pieris rapæ*, L., and *P. napi*, L., both of a very ordinary form and showing no tendency to variation. *Lycæna icarus*, Rott., several males normal; the only female, much shot with blue, and the ocelli at the apex of primaries whitish; one male has the two inner spots on the costa of secondaries on the underside united. *Cidaria truncata*, Hufn., several somewhat large, and more or less suffused with dull greyish brown. *Camptogramma bilineata*, L., several very ordinary specimens. Indeed, the most remarkable circumstance appears to be that, although at least three of the species, *i.e.*, *P. napi*, *L. icarus*, and *C. truncata*, are known to be liable to somewhat pronounced local variation, the specimens from these remote islands should be normal. From some flower-heads of *Silene maritima*, which my brother found growing in some abundance in one or two restricted localities, I bred five specimens of *Sciaphila conspersana*, Dougl., some of which are decidedly more strongly marked than any that I have seen from our south coasts, and one female of *Sphaleroptera ictericana*, Haw."

Mr. Adkin also exhibited examples, and read a paper on the cocoons of *Eriogaster lanestris*, L. (p. 67).

Mr. Cooper exhibited some black-dotted specimens of *Porthesia chrysorrhæa*, L., received some years back from Whittlesea Mere, Cambridgeshire.

Mr. C. G. Barrett remarked that the position of the black dots in these specimens indicated the sub-terminal line and a discoidal spot; *Lælia cænosa*, occasionally showed by a dot or two where these markings would be.

Mr. R. South mentioned that species from Japan allied to *P. chrysorrhæa* were strongly marked with black.

Mr. T. R. Billups exhibited the following species of Mollusca obtained from drift collected by Mr. C. G. Barrett in Wales:—*Anomia ephippium*, *Buccinum undatum* (fry), *Barleeia rubra*, *Capulus ungaricus*, *Cardium fasciatum*, *Cerithium reticulatum*, *C. perversum*, *Cerithiopsis tubercularis*, *Circe minima*, *Cyamium minutum*, *Defrancia linearis*, *Eulima distorta*, *Helcion pellucidum*, *Lacuna crassior* (young), *L. puteolus*, *Lasea rubra*, *Littorina littorea*, *L. neritoides*, *L. rudis*, *Mactra stultorum*, *Modiolaria discus*, *Murex erinaceus*, *Mytilus edulis*, *Nassa incrassata*, *Natica alderi* (with fry), *N. alderi* var. *alba*, *Nucula nucleus*, *Odeorbis subcarinata*, *Odostomia indistincta*, *O. plicata*, *O. spiralis*, *Patella vulgata*, *Pecten opercularis*, *P. pusio*, *Phasianella pullus* and vars.—*millepunctata*, Cockerell (Zool. 1887, p. 116), previously recorded from Ireland, *ziczac*, Cockerell (Nat. World, 1885, p. 218), and *bicolor*, Mont. (new to Britain); *Rissoa cancellata* (young); *R. costata*, *R. parva*, *R. punctura*, *R. semistriata*, *R. striata*, *Saxicava arctica*, *Scalardia communis*, *Spenea planorbis*, *Tectura virginia*, *Trochus cinerarius*, *T. tumidus*, *T. zizyphinus*, *Urticulus truncatulus*, *Venus ovata*.

Among the Foraminifera there were representatives of *Cristellaria*, *Miliolina*, and *Cassidulina*. There were also numerous specimens of *Echinocyamus pusillus* (the green pea urchin), and many fragments of Echinodermata.

Mr. J. Jenner Weir exhibited wet and dry season forms of *Funonia asterie*, L., *Funonia almana*, L., and *Melanitis ismene*, Cram., and contributed a short paper on the species (vide p. 65).

MARCH 10th, 1892.

C. G. BARRETT, Esq., F.L.S., *President*, in the Chair.

Mr. Jenner Weir exhibited pallid forms of the following British Rhopalocera, viz.: *Satyrus semele*, L., ♀; *Epinephele*

ianira, L., ♀; *E. hyperanthes*, L., ♀; *Cænonympha typhon*, Rott., ♂; *C. pamphilus*, L., ♀ (3 specimens), and *Heodes* (*Polyommatus*) *philæas*, L., ♂.

All these xanthous specimens were, he said, much paler in colour than usual, and he regretted that he could not suggest a cause for this want of colour, except in the case of *Epinephele ianira*. This insect he had taken in the New Forest during the very wet and cold season of 1879, in a damp wood; the temperature was then so low that when *Argynnis paphia* was pursued it took refuge in the thick brambles, being too weak to fly far; and *Brenthis* (*Argynnis*) *euphrosyne* had its emergence delayed through July, in some cases even till so late as the 9th of August. His view was that the development of pigment was due to what might almost be termed surplus energy, and that if the vitality of either the larva or chrysalis was lowered by unfavourable environment, then the result might be that the imago would be defective in colour. Applying this argument to the *E. ianira* under consideration, he was of opinion that in the chrysalis its vitality had been impaired, and the energy necessary to produce the normal colour had not been forthcoming.

MARCH 24th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. J. R. Burt was elected a member.

Mr. F. Merrifield exhibited examples of *Selenia illustraria*, Hb., *S. illunaria*, Hb., *S. lunaria*, Schiff., *Vanessa urticæ*, L., *Platypteryx falcataria*, L., *Chelonia caia*, L., *Bombyx quercus*, L., and var. *callunæ*, Palmer, to illustrate the effects of temperature on these species when bred in confinement. He remarked that the specimens shown were only a portion of those he had reared, and the results obtained were even more conclusive when the whole of the series of a species were compared together; the full results of his experiments, so far as he had at present carried them, had already appeared in the Transactions of the London Entomological Society, and he only proposed this evening to give a brief summary of the results of his experiments.

APRIL 14th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. South exhibited specimens and drawings of curious aberrations of *Arctia caia*, and made the following remarks

thereon. "In considering the variation of *Arctia caia*, we have to deal with two classes of aberration. In one of these, which, for convenience, I term the legitimate, we find every gradation between the darkest and palest extremes. In the other, which may be styled the abnormal, the aberration appears to be of an irregular character, and possibly the result of influences about which we know very little at present. In this class I place specimens which depart from typical lines in the matter of colour, as for instance: examples with coffee-coloured hind-wings, or buff-coloured markings on fore-wings. The buff-colour can be produced by artificial means, and I exhibit two specimens upon which I have operated. Abnormal coloration occurs in otherwise perfect and well-formed specimens, and in such cases it is difficult to offer a suggestion as to the probable cause of the change in colour. In other specimens there is abnormal coloration in conjunction with more or less malformation of the wings, but there is no evidence to show that the change in colour is due to the malformation. Although it is quite possible that the cause of change in colour is also the cause of malformation, it must be admitted that each may have resulted from quite different causes. Suppose we argue that malformation is the direct result of injury to either larva or pupa we should probably be correct; but it does not follow that injury to the larva or pupa is also the cause of changed colour in the wings, because we can have a colour change without malformation, and malformation without change of colour.

Returning to what I term legitimate varieties, I exhibit figures of two very different forms of *A. caia*; one approaching the darkest, and the other the lightest limits of the insect's variation; and also a number of specimens showing various modifications, and to which I have already directed your attention. If we collect larvæ of *A. caia* from any district, we shall find that the specimens bred therefrom exhibit more or less difference in the amount of dark colour. We rarely, however, get such aberrations as those figured. Now, there are two questions which suggest themselves in this connection: Are these rare varieties the immediate result of some occult influence of which we have no knowledge? or are they the offspring of well-matched parents? It occurs to me that increase or decrease of dark colour is really due to what may be termed 'accident of birth.' If, for instance, both parents have more than the normal amount of dark colour, most of the offspring will inherit this dark colour, and some will probably be even darker than the parents. Of course, I only

put this forward as a suggestion as regards the species now under consideration ; but in the case of *Boarmia repandata*, I have proved that if both parents are of the *conversaria* form, most of the progeny are of the same form ; whilst some are more beautifully marked modifications of that form, and still further removed from the *repandata* form than were the parents. In experiments with other species, the results have also been of a similar character ; and altogether I am led to believe that by careful selection throughout a series of generations, it would be possible in the case of *A. caia* to produce entire broods of such varieties as those of which drawings are exhibited."

Mr. South also exhibited some examples of *Arctia caia*, L., artificially darkened by being killed with nicotine after the expansion of the wings, and before they had dried. Mr. Fenn suggested that insects were not killed at once by nicotine, but remained some time in a paralyzed condition ; hence the change might take place during the extremely slow circulation of the blood before death ensued. Messrs. Tugwell, Frohawk, Adkin, etc., made remarks as to the apparent absence of the sensation of pain in insects.

Mr. C. G. Barrett exhibited a long series of *Noctua festiva*, Hb., from all parts of the British Isles, including Ireland and Shetland. He stated that Mr. Hart of Dublin had taken worn *N. festiva*, at sugar early in June. The species then disappeared, and later on it appeared again, and these latter examples seemed to him to be a partial second brood. Some of these were smaller and with narrower wings, comparable to the so-called Scotch *N. conflua*. He expressed the opinion that the series shown were all of one species.

Mr. Robt. Adkin also exhibited series of this species from Forres, Rannoch, and Shetland. The Forres series comprised captured as well as bred specimens. The latter, he believed, were from one batch of ova, and the larvæ had been fed up in a warm room, the moths appearing during the winter months. Some of them were full-sized, and much resembled the typical southern form ; while others were small, narrow-winged specimens. The captured Forres and Rannoch specimens were somewhat small, and showed great variation in ornamentation ; while the one bred Rannoch example was large in size and pale in colour. In the Shetland series exhibited, the general tendency was in the direction of melanism.

Mr. Tugwell exhibited *N. festiva*, Hb., a series of South of England forms, specimens from Aberdeen, two from

Shetland, and one from Kincardineshire: the latter agreed exactly with the Shetland form. He stated, that the late Mr. Doubleday was of opinion that *N. festiva* and *N. conflua* were one and the same species, and that he had bred both forms from Durham. Mr. Lewcock said that from an examination of Mr. Tutt's very long series of *N. festiva* and *N. conflua*, he could observe no satisfactory specific distinction. Mr. Fenn questioned the occurrence of a second brood in so short a time, and stated that the Shetland forms in his possession were of all shapes, the wings of some being narrow, and of others broad. In his opinion the narrowness of the wing was a result of hardness of conditions of life, a kind of immaturity. Mr. South said that Mr. Tutt based his distinction of *N. festiva* and *N. conflua* mainly on the shape of the wing, whereas Treitschke in his description of *N. conflua* did not mention shape. The original type came from the Reisingebirge, in Silesia, and since then specimens obtained from Iceland had been referred to the *conflua* of Treitschke. The Shetland specimens were not in any way referable to typical *conflua*, but were the var. *thulei* (*thules*) of Staudinger. He doubted the narrow wing being due to immaturity, but thought that narrow wings were an aid to strong flight, which was often a necessity in exposed localities. The small moorland form, generally known as *conflua*, was not peculiar to the north, for he had taken it in Devonshire. On the north of Exmoor he had captured both the ordinary form and the moorland one, at sugar, on the same ground; but on the open moorland the larger or typical form of *N. festiva* had not been observed. Mr. Barrett remarked that mountain species were often taken on high moorlands, and instanced *Larentia salicata*, Hb. He considered that swiftness of flight was largely aided by breadth of thorax, a more solid attachment being obtained for the muscles, giving as an instance the family of hawk-moths. Mr. Fenn noted the size of nervures as being an important factor. Mr. Frohawk considered weight also necessary in strong flight, instancing the duck and pheasant. Several members continued the discussion, and referred to the special development of the chest and keel, and the similarity of form between hawk-moths and humming birds.

Mr. Barrett exhibited a specimen of *Notodonta bicolor*, Hb., belonging to Major Still of Devon, which he considered was undoubtedly British. It was discovered in a small local collection under the name of *N. cucullina*, and had been taken by its original possessor about 1880. He also ex-

hibited on behalf of Mr. Sydney Webb, vars. of *Argynnis adippe*, L., two being suffused with black, one with very considerable additions to the ordinary silvery markings, and two of *cleodoxa*, Och., a variety in which the silvery markings were wanting. An exceedingly pale primrose var. of *Cænonympha pamphilus*, L., two *Apatura iris*, L., showing two degrees of the var. *iole*, Schiff., one with the band entirely obliterated, and in the other partially so. Also two vars. of *Limenitis sibylla*, L., with the bands partly absent.

Mr. Robt. Adkin exhibited series of *Phibalapteryx lapidata*, Hb., from Rannoch, and *P. vittata*, Bork. (= *lignata*, Hb.), from Paisley. With regard to the latter he said that it was somewhat remarkable, that, although his fellow member, Mr. W. Smith (to whom he was indebted for the specimens exhibited), together with other entomologists, had been in the habit of collecting over the same ground where they were taken, for some years, they had not met with a single example of the species until 1890, when they found it in some abundance, and again in 1891 it had been equally common. It could hardly be supposed that it had occurred there in any number, and been overlooked by them altogether. On the other hand, if it had been so exceedingly scarce as to evade observation or had been absent altogether, it was very remarkable that it should become suddenly so abundant. The question was one of some importance, and it would be interesting to note whether the species continued to occur there as it had done during the past two years, or whether it again disappeared from the locality.

Mr. Tugwell endorsed Mr. Adkin's remarks, and stated that some of his specimens from the same locality were extremely dark. Mr. Fenn remarked on its habit of frequenting moist situations. Mr. South said he once took a female at Mill Hill, and reared a long series the same year. The larvæ were fed on clematis.

Mr. Edwards exhibited *Sirex gigas*, L., and *Cicadetta montana*, Sep., from the New Forest, and stated that stridulation in the latter species was confined to the males, and was due to two membranes acted on by muscles placed in a cavity at the base of the abdomen, these muscles being covered externally by the dilated sides of the metasternum.

Mr. Edwards also exhibited specimens of the exotic genera *Thais* and *Parnassius*, with the only species *helios*, of the intermediate genus *Ismene*.

Mr. Barrett asked if the British species of *Cicada* stridulated, and Mr. Billups, who had taken a number at Haslemere, said he had not noticed it.

Mr. Lewcock exhibited *Silpha atrata*, L., vars. from English, Scotch, and Irish localities, var. *subrotundaria*, coming from the Orkneys, and from Ireland. Also *Mesites tardii*, Curt., male and female, to show that in the male the antennæ are inserted nearer the apex of rostrum than in the female, and that the male has a much stouter rostrum. It was also noted that this species was now taken in numbers under the bark of old holly trees.

Mr. Frohawk made a remark concerning the attempt to exterminate *Melitæa cinxia*, L., from its only remaining English locality, a dealer having advertised hundreds of larvæ for sale. With regard to this species it was noted that hybernacula with young larvæ were always found nearer the shore than were the older larvæ, and also that the hybernaculum was divided into several compartments, and frequently found attached to grass stems at a distance from plantain, the larval food.

APRIL 28th, 1892.

C. G. BARRETT, F.E.S., *President*, in the Chair.

Messrs. E. H. Taylor and J. V. Blachford, M.B., M.R.C.S., were elected members.

Mr. Frohawk exhibited a black specimen of *Apatura iris*, L. (var. *iole*, Schiff.), and some examples of *Pieris napi*, L., taken near Cambridge.

Mr. Cant exhibited a case showing preparations of the genital organs of various species of Hesperiidæ.

Mr. C. G. Barrett exhibited, on behalf of Major Still, a long series of *Demas coryli*, L., reared on beech, which, he stated, was the usual food-plant of the species in Devonshire.

Mr. Barker stated that he very rarely obtained the larvæ of this species from hazel, but it was very common among beech.

Mr. Barrett also exhibited varieties of Rhopalocera on behalf of Mr. Sydney Webb, of Dover, among which was a series of *Melanargia galatea*, L., ranging in colour from very dark to very pale; and on behalf of Mr. Sabine, the following varieties of *Argynnis*: *A. latona*, L., with the black spots much enlarged and the wings suffused with a peculiar bronze colour; *A. euphrosyne*, L., in which the black spots were united, and formed deep black bands; *A. selene*, L., a suffused specimen, with the black spots forming ill-defined bands.

Mr. Edward Step delivered a lecture on "Lichens;" in

the course of which he remarked that at one time these plants were considered as forming a distinct tribe. Now, however, they were considered by leading cryptogamists to be merely commensals, or partnerships formed between a fungus and an alga. By means of blackboard diagrams the lecturer explained the structure of the lichen-thallus, and the nature of its several strata. Briefly, there were an upper and a lower epidermal layer, consisting of a close aggregation of cells, and to the lower layer rhizines were attached. Between these layers of epidermis were two differing elements: a loose stratum of green cells (*gonidia*), and below this a medullary layer of hyphæ. The *gonidia* were very similar to the simple alga *Protococcus*, and the contention of the new school was that these *Protococci* had been captured by an ascomycetous fungus and held in bondage. By means of their chlorophyll the *gonidia* were able to manufacture starch from the inorganic material obtained by the rhizines (mycelium), and this starch the other portions of the co-operative organism were enabled to feed upon. Some of the *gonidia* were pushed out of the thallus from time to time, covered with a slight wisp of hypha (*soredia*), and had the power to grow into another lichen-thallus, or to increase simply as *gonidia*. Schwendener and Bornet claimed to have produced lichens by sowing the spores of *Parmelia parietina* among *Protococci*, and that wherever the hyphæ came into contact with *Protococcus*, in groups or singly, they attached themselves. Tulasne and De Bary, however, believed that they had detected the growth of *gonidia* from the hyphæ; Berkeley also believed in this mode of origin for *gonidia*; and the lecturer suggested that *Protococcus*, instead of being a distinct species, might be merely the escaped *gonidia* from lichens leading a free and independent life. The varieties of the thallus and their habits were next considered; the phenomena of growth and reproduction; classification and uses; and hints on their collection and preservation. Much interest was added to the lecture by the exhibition of a large number of mounted specimens.

MAY 12th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. R. Adkin exhibited specimens of Lepidoptera picked out from a collection made at Rannoch, and remarked that in a limited selection it was impossible to show the whole range of variation. There was nothing of special interest

among the butterflies or the Noctuæ, but he thought considerable interest attached to the extreme forms of Geometræ (see *Entomologist* xxv., pp. 105-110).

Mr. Barrett called attention to the forms of *Cænonympha typhon*, Rott., which, he said, were rather the extreme of the mountain form of the species, and exhibited an unusual number of white spots.

Mr. J. Jenner Weir also thought the white spots to be exceptional in mountain specimens of *C. typhon*.

Mr. Barrett exhibited curious varieties of *Melanippe fluctuata*, L.

Mr. Frohawk exhibited living larvæ of *Melitæa aurinia*, Rott., *M. cinxia*, L., and *M. athalia*, Rott., *Argynnis euphrosyne*, L., and *A. paphia*, L., and stated that one of the *A. euphrosyne* had hybernated at the end of July, 1891, and did not commence feeding again until the beginning of April, 1892; and although the imago should be out by this time, the larva was still feeding, and was 318 days old. The larvæ of *A. paphia* were 282 days old, they having hatched on the 8th of August last, and they at once hybernated without eating anything. He had paid particular attention to this point, and had carefully examined them every week, but they did not appear to have moved at all; they rested exposed on the stems of the wild dog violet, and so hybernated. On April 25 an examination of the plants showed four larvæ which had moulted, and one of the two exhibited did not moult until four days afterwards; they were now feeding most rapidly.

Mr. Frohawk said he understood it was the first time that *A. euphrosyne* had ever been carried successfully through the winter in confinement, and in reply to a question from Mr. Barrett he stated that it appeared to be a matter of indifference to the larvæ of this species whether the day was sunny or not, as it went up and started feeding each day about ten or eleven, and fed on until five, then going off the plant and resting on the side of the flower-pot; whereas larvæ of *M. aurinia* and *M. cinxia* only fed in the sunshine.

Mr. C. G. Barrett exhibited a long series of examples of *Melitæa aurinia*, Rott., from various parts of the United Kingdom, in order to illustrate the local variation of the species. Mr. Barrett pointed out that a form known in Scotland, and in Ireland, and some parts of the north-west of England, had the whole of the basal portion filled up with black; in the south of England a very rich fawn-coloured form occurred; and in Pembrokeshire a pretty yellow form

was found now and then, probably every year. Somewhere in the hilly districts of Staffordshire there was a form having the central markings very grossly scaled, and therefore it somewhat approached the Scotch form referred to.

Mr. J. Jenner Weir, referring to the disappearance of this species from many well-known localities where it once occurred freely, doubted whether it could be attributed to over-collecting. Mr. Tugwell said that an old locality near Sandwich was occasionally entirely inundated with water; and this, together with the over-collecting that had taken place, would easily account for its disappearance. Mr. Tutt said it could not be over-collecting which had caused the disappearance of *M. athalia* from Chattenden; and, as regards the effect of floods and tides, he instanced the case of *Agdistis bennetii*, Curt., which came up as fresh as ever on the tide going down.

Mr. Tugwell stated that during the week he had a run down to Tilgate Forest, and was surprised to find *Argynnis euphrosyne*, L., flying in some numbers, and he obtained a very pretty variety. He had also taken some nice forms of *Syrichthus malvæ*, L., and *Nisoniades tages*, L. He had only taken some six or seven larvæ of *Sesia sphagiformis*, Fb., as the ground appeared to have been already thoroughly worked. The spring flowers were not so forward as the lepidoptera by a fortnight or three weeks. Mr. Tugwell also referred to the disappearance of the nightingale from Tilgate during the last two or three years.

Mr. J. A. Cooper referring to Mr. Bouttell having, on one occasion, captured several specimens of *Tæniocampa opima*, Hb., on Wanstead Flats, Essex, now reported that he had taken nests of larvæ, and seen many others, which were undoubtedly referable to this species.

MAY 26th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Messrs. James Evans, A. H. Shepherd, and C. Pannell, Jr. were elected members.

Mr. Jenner Weir exhibited a specimen of *Anosia plexippus*, L., var. *erippus*, Cramer, which had been obtained by one of the employes of Captain Parke in the Falkland Islands: until this insect was captured the only butterfly known in those islands was *Brenthis cytheris*, Drury. During Captain Parke's residence in these islands for about twenty years he had never seen a specimen of the *Anosia* in ques-

tion; it, therefore, appears that, like its northern representative, the true *Anosia plexippus*, the southern form had the migratory habit similarly developed.

Mr. Hawes exhibited *Pieris napi*, L., and read the following notes: "The series of *P. napi* exhibited were bred from ova laid by the parent insect, which was taken near Bentley, Suffolk, on or about June 10th of last year (1891). The larvæ were fed on the leaves and young stalks of *Alliaria officinalis*, on which plant I have found the full-grown larvæ on two occasions in the north of London. They fed up rapidly and well, only a small percentage of deaths occurring, and by about July 5th had begun to assume the pupa state. On July 21st the first imago put in an appearance, followed at short intervals by twenty more, to July 31st, *i.e.*, seven males and fourteen females. After July 31st there was a complete cessation in emergence. I have a note, written at the time, to the effect that 'a cool day retards emergence,' not thinking that the whole of August, although below the average temperature, and September, with at least one brilliant week, would be powerless to entice the butterfly from its chrysalis. It should be mentioned that the insect was kept through all its stages in a room at the top of the house, which, with a southern aspect, is exposed to all the heat and cold without artificial protection. The larvæ were brought up in large gallipots, and so kept cool and feeding steadily. When the last moult had been got through, they were all transferred to an ordinary wooden cage, and there pupated. This cage was not removed from the room until the middle of October, when, with others, it was placed under the seat of our summer-house, exposed to the north. Being brought in about April 20th, and placed on a window sill in the sun, between May 6th and 20th, thirty-one more imagines appeared, about one third males and two-thirds females. I should like to call attention to a certain amount of variation in the veining on the underside. In the summer form the males are more prominently marked than the females; in one specimen there is as much pencilling as in an example of the spring form, but the spring form is generally well defined, as usual. In the females the tendency is to slight pencilling, and in both summer and spring forms to an abrupt shortening of the pencilling. In conclusion, I can only suggest, what is perhaps apparent enough, that the cool summer of last year, together with the fact that the nights under a partly open window in a top room, in a locality which is 350 feet above

sea level, affected the pupæ to such an extent as to retard three-fifths until the warm sun of April reassured the dormant imago."

Mr. J. Jenner Weir stated this was the most interesting exhibition he had ever seen on this subject; one portion of the larvæ produced from one female emerging as the summer form, and the other portion as the spring form, and reared under exactly similar conditions. After referring to the differences between the two forms, he concluded by adding that although he had devoted considerable years to the study of this species he had never succeeded in obtaining so conclusive a case as this as to the identity of the two forms, to which earlier writers had given distinct names. Mr. Weir also called attention to the careless way in which the two forms were placed together in most collections.

Mr. Frohawk exhibited two pupæ of *Argynnis paphia*, L., and stated that the larvæ had only attached themselves for pupation early yesterday morning, and on looking last night they had both pupated, the time occupied being from eighteen to twenty hours; the temperature was 80° in the shade. Referring to the brilliancy of the metallic spots, he expressed an opinion that the object of it was mimicry of a dewdrop on a dead leaf.

Mr. Frohawk also stated that the larva of *A. euphrosyne*, L., exhibited by him at the last meeting, had pupated on the 24th inst.

Mr. Carpenter exhibited a specimen of *Vanessa antiopa*, L., taken on Tooting Common some years back.

Mr. R. Adkin exhibited *Asteroscopus nubeculosa*, Esp., and remarking on the time the specimen had been in pupa, viz., two years, added that on the previous occasion he bred the species the larvæ went down in 1884, none emerged in 1885 or 1886, but five emerged in 1887.

Mr. Tugwell exhibited the specimens taken by him at Tilgate Forest, and referred to at the previous meeting, viz., *Nisoniades tages*, L., which showed considerable variation. *Syrichthus malvæ*, L., also varied considerably, one example closely approaching the variety *taras*, Meig.; *Argynnis euphrosyne*, L., showed an enlargement of the black spots, and *Phytometra viridaria*, Clerck., were as large and rosy as specimens coming from the New Forest.

Observations were made on the unusual abundance of *Plusia gamma*, L., in the summer of 1892; and Mr. Adkin remarked that up to the 24th of May he had not noticed a single specimen of the species, but that on the evening of

that day he was surprised to find great numbers of the *Plusia* in his garden at Lewisham; specimens continued to occur, but in lesser abundance, until June 10th, after which date only one individual was noted.

Mr. Jenner Weir delivered a Zoological Lecture, in which he drew attention to some remarkable cases in which mammalia and birds, having been in remote geological times differentiated for one mode of life, had adopted entirely different habits. Among the mammalia he instanced such anomalous animals as the tree kangaroos of northern Australia and New Guinea, the fishing bat of Trinidad; and among birds, ground parrots, cuckoos and even woodpeckers, tree ducks and non-aquatic geese.

JUNE 23rd, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Miss Jean Dalrymple was elected a member.

Mr. F. W. Hawes exhibited boxes containing ova (dried), larvæ, and pupa, with imago of *Hesperia lineola*, Och., and read a short paper describing the earlier stages of the species. He stated that he had been able, from ova obtained in August, 1890, to get larvæ through their first moult, and by means of others swept from grasses on the Essex coast during June (1892) to obtain a pupa. In describing the larva he referred to the fact that this species (and also *H. thaumas*, Hufn.), passes the winter in the egg, emerging as larva about April 20th, and feeding for about eight to ten weeks in a deliberate fashion, chiefly at dusk, on *Triticum maritima* and other coast grasses. In comparison with *H. thaumas*, the full-grown larva was stated to be of a yellower tint, softer and even velvety in appearance, but as in the case of the perfect insect the resemblance between the two species, especially in the final stage, was very close. The pupa (similar to that of *H. thaumas*) was enclosed in a network of silk spun among the blades of grass.

Messrs. Hall, Croker, and Tugwell stated that they had taken *H. thaumas* on the sea wall, together with *H. lineola*.

Mr. Turner exhibited a short series of *Stauropus fagi*, L., bred from larvæ taken in Epping Forest the previous autumn; also a very variable series of *Thera variata*, Schiff., bred from larvæ taken at Westerham during Easter. He also exhibited the cocoons of the first-named species, and called attention to the accurate reproduction of the veining of the leaf in all its details on the surface of the cocoon.

Mr. F. W. Frohawk exhibited coloured drawings of the larva and pupa and a large and beautiful bred series of *Melitæa cinxia*, L., from the Isle of Wight, showing much variation in depth of marking: one specimen having very dark suffused hind wings, whilst in others the central band of the fore-wings was absent.

Mr. Frohawk also exhibited a male example of *Pieris napi*, L., bred from ova laid June, 1891, the larva pupating in July, and the imago emerging June, 1892. The specimen was almost intermediate between the spring and summer forms of the species, but more nearly approached the spring form.

Mr. W. H. Tugwell exhibited varieties of *Argynnis selene*, Schiff., one specimen having three separate silver spots on the upper surface of each of the inferior wings, and a variety of *Melitæa athalia*, Rott., with one of the inferior wings almost black.

Mr. T. W. Hall exhibited a spike of Foxglove (*Digitalis purpurea*, L.), with one of the flowers at the top of the spike fully developed, and in appearance very like the canterbury bell. Mr. R. Adkin reminded the meeting that Mr. W. A. Pearce had exhibited a somewhat similar variety on a former occasion.

Mr. F. W. Frohawk exhibited fine examples of Edelweiss, which he stated had been grown in the open-air in Mr. G. F. Wilson's experimental gardens at Wisley, Surrey.

Mr. Tugwell remarked that, in company with Mr. Porritt, he had been recently collecting in Abbott's Wood, Sussex; and in the course of eight nights' sugaring, he estimated that they had seen twenty thousand insects on the sugar, and during the trip they had taken examples of one hundred and sixty-one species of Macro-lepidoptera.

JULY 14th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. C. Oldham exhibited, among other species, *Dicycla oo*, L., and *Cymatophora octogesima*, Hb., taken at sugar in Epping Forest. He remarked that *Calymnia trapezina*, L., had been very scarce in the Forest, and many other common oak-feeding species had been noticeable on account of their small size, which he attributed to the denudation of the oaks by the larvæ of *Tortrix viridana*, L.

Mr. Barrett having observed that *C. octogesima* was an unusual species to obtain at sugar, Mr. Oldham said he found it

at a small drop of sugar on the tree trunk, and quite close to the ground.

Mr. R. Adkin exhibited a pupa case of *Sesia scoliiformis*, Bork., *in situ*, to illustrate the manner in which the pupa pushed its way through the bark when about to emerge.

Mr. Tugwell said the pupa of a *Sesia* had the power of travelling up and down the stem in which it had pupated. In the case of *S. sphegiformis*, Fb., he had frequently watched the pupa push its way through the bark, in many cases protruding over the eighth of an inch; and upon a change of weather, instead of the imago coming forth, the pupa had withdrawn again into the burrow, and perhaps remained there for two or three days before emerging. Mr. Tugwell added that the burrow was a fairly smooth chamber, the bottom of which was covered by frass and silk, and this prevented any insect from entering from below. Mr. Tutt remarked that *Orthotelia sparganella*, Thnb., Sta., and *Tapinostola typhae*, Esp., had the same power of going up and down the stem; he also referred to the hardness of the cocoons of *Sesia culciiformis*, L., and *S. asiliformis*, Rott. Mr. R. Adkin referred to his experience in breeding *S. chrysidiformis*, Esp., and said he had always found them pupate in the roots, and he had never seen the sort of tower, which it was stated by some Lepidopterists this species always threw up at the head of the cocoon. Mr. Tutt remarked that he had never seen anything but those made by the feeding larvæ, just before pupation, cleaning out the burrow. Mr. Tugwell said that he had many times reared the last-named species, and had only seen the dome or tower-like arrangement on one or two occasions; once he had observed a similar thing with *S. sphegiformis*. He thought that no doubt the explanation of these towers or dome-like projections was insufficient food, and in this opinion Mr. R. Adkin and Mr. C. G. Barrett concurred.

Mr. C. G. Barrett exhibited, on behalf of Mr. Holland, of Reading, a fine series including many melanic forms of *Stauropus fagi*, L., taken in the beech woods in the neighbourhood of Reading, and stated that Mr. Holland informed him that the species had occurred this year, from May to the beginning of July, and were mostly taken setting upon the stems and trunks of the smaller beech trees.

Mr. C. Fenn referring to the time of flight of *Catoptria juliana*, Curt., stated that he had found it flying commonly over apple trees in his garden for three successive evenings, and the time was, as nearly as possible, eight o'clock; and the flight was just before that of *Carpocapsa pomonella*, L. The

Silac + sparganella
arundinis

first-named species flew very high up, and had a very powerful flight.

Mr. C. Fenn also informed the meeting, that on the previous Saturday (July 9th), *Hesperia lineola*, Och., was out freely at Leigh, Essex, and that on the dry bank where it occurred he had picked up a nearly full-fed larva of *Saturnia pavonia*, L. Mr. Croker referred to the abundance of the larva of *Vanessa atalanta*, L., and added that *Colias edusa*, Fb., was very abundant at Riddlesdown, Surrey, and observations were made as to the occurrence in numbers of these two species, together with *Plusia gamma*, L., and also as to the number of captures of *Deiopeia pulchella*, L., which had been recorded.

Mr. C. G. Barrett remarked on the effect one hot season had in causing many species of insects to recover from the depression of the last two or three years.

JULY 28th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. Frohawk exhibited seven specimens of *Epinephela hyperanthes*, L., bred from ova, and stated that the female parent, which was of the ordinary form, was taken in the New Forest. Three of the specimens bred, however, were of the lanceolate form, and Mr. Frohawk considered it probable, therefore, that the male parent was of this form.

Mr. Frohawk also remarked on the abundance of the larvæ of *Vanessa atalanta*, L., and mentioned that from ova deposited by two females of *Colias edusa*, H., taken in the spring, he had obtained 70 pupæ. He further exhibited living pupæ of *Colias edusa*, Fb., *Vanessa cardui*, L., and *V. atalanta*, L.; also a variety of *Sesia formiciformis*, Esp., having the usual red colour replaced by burnished gold.

Mr. R. South exhibited specimens of *Zygæna trifolii*, Esp., from Middlesex, among which there was considerable variation in the size and colour of the spots, in the colour of the hind wings and in the width of the border of the hind wings; all the known phases of variation in this species being represented. He also exhibited *Asthena blomeri*, Curt., taken in Buckinghamshire, and remarked that it was extremely abundant in a certain wood, which he believed was the nearest known locality to London.

Mr. C. G. Barrett exhibited *Vanessa c-album*, L., and pointed out differences between the first and second broods: a discussion ensued, the general opinion being that the species was clearly double-brooded.

Mr. Frohawk recorded taking three white-spotted specimens of *Argynnis paphia*, L., in the New Forest, and added that var. *valesina*, Esp., was fairly common, and *Limenitis sibylla*, L., exceedingly so, though very late in its appearance.

AUGUST 11th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. Hawes exhibited living larvæ of *Hesperia comma*, L., and read the following note: "The larvæ of *Hesperia comma* exhibited, was found on 25th June last on the sheep lees at Horsley, Surrey. At that time it was very small, and was only noticed by reason of the nest it had made of two lotus leaves spun together. Having reared the larvæ of *H. sylvanus*, Esp., from the egg, I at once knew that I had found *H. comma*, and am now able to show the full fed larva for, I believe, the first time. The description is as follows: The full fed larva has a large purplish black head with two minute faint spots, the lobes being paler, with their central parts darker. The body is a dull green exactly similar to the lotus leaf, clearer on the sides; dorsal stripe, darker green, and distinct. There are two very indistinct lighter lines on each side, and a third joining the spiracles, which are yellow. In shape, this larva agrees almost entirely with that of *H. sylvanus*. Head large and wide, second to fourth segments very narrow, fifth to twelfth gradually increasing and decreasing in bulk. It is very retiring in its habits, spinning the leaves of lotus together, and forming a retreat from which it only ventures a short distance, but it eats both flowers and leaves of this plant very freely. It generally rests with the head slightly curved on one side, and is very sluggish in its movements. I fail to detect the white spots mentioned by several writers as existing on the 10th and 11th segments."

Mr. West (Streatham) exhibited *Apamea ophiogramma*, Esp., and *Eupithecia succenturiata*, L., Mr. Barrett said the specimens of the former species were very dark, and one example unusually so; Mr. J. A. Cooper remarked that *A. ophiogramma* frequently occurred at Chingford.

Mr. Russell exhibited a handsome specimen of *Pieris napi*, L., from Woking, Surrey, the upper wings being strongly suffused with black, and the spots unusually large. Mr. Barrett said the specimen was much more strongly marked than those from the north of Ireland. Mr. Russell also exhibited a series of varieties of *Epinephele ianira*, L., males and females, from Abbott's Wood: one male showed the

orange-coloured blotch, in imitation of that of the female, which Mr. Barrett observed was the form found in the more northern and western range of the species.

Mr. H. Moore exhibited three species of Orthoptera from the Amatola Mountains, South Africa, viz., *Platypleura divisa*, Germ., a pretty Cicada with moth-like coloration and markings: *Phylloptera prasinata*, Stal., a green tree cricket: and *Ædipoda pictus*, a grass-hopper, showing considerable variation in the density of the colouring of the hind wings, the specimen shown having a faint tinge of yellow.

Mr. Short referred to the exhibit made by Mr. Rice (on behalf of Mr. Hickling) at the last meeting, of ova deposited on asparagus, and, in supporting Mr. T. W. Hall's identification, showed ova of the same species, i.e., *Triphana pronuba*, L., on rush.

Mr. Hawes called attention to the tendency to lightness in colour of many species of butterflies during the present season, and gave as instances the extra brilliancy of the blue in the males of the second brood of *Lycæna icarus*, and the large proportion of the females of that species which were blue. Mr. Barrett thought that this was probably due to the somewhat unusual heat, and stated that the late Mr. Bond could easily distinguish Continental from British specimens by the pale colour, which he attributed to the greater heat and continual sunshine.

Mr. Carpenter comparing *Vanessa atalanta*, *V. cardui*, and *Argynnis paphia* var. *valesina*, of the present season with those he had taken in 1886, said they were decidedly darker. Mr. Hawes said the species that Mr. Carpenter had mentioned, followed, in his opinion, the general tendency of the blues, and were not only paler, but the spots were larger and much more pronounced.

The President read a letter from Mr. J. Jäger recording the capture of *Callimorpha hera*, L., at Starcross, S. Devon, and the following is an extract from such letter: "Its first appearance was on the 6th August. As there are still a number of unbelievers regarding the genuineness of this beautiful moth, I must again come forward as an advocate in its defence, as I have done from the beginning, since I first had the good fortune to capture it. Anyone knowing the country about here, intersected as it is by wooded mountains and again tracts of marsh land, will, I feel sure, never favour the theory that it has been satisfactorily planted; and I know from my own experience that it occurs within a range of about eighteen miles, probably still further

extended. Had it been introduced in an artificial way, would it not be probable that it would have remained strictly localised, or perhaps have only lasted a certain time, and then have become extinct?"

AUGUST 25th, 1892.

R. SOUTH, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. Frohawk exhibited a fine bred series of *Colias edusa*, Fb., all the females being tinged with green on the hind wings; also a living larva of *Carterocephalus palæmon*, Pall. Mr. Carrington said few entomologists had had the good fortune to see the larva of this species, although he had an unpublished record of it dating as far back as the fifties.

Mr. Macmurdo exhibited a series of *Bryophila perla*, Fb., and remarked that the lichens on the wall from which they were taken varied considerably. Mr. Adkin said the variation appeared to him to arise from an increase in the size and tone of the darker markings, the whole of the specimens being of a form in which the ground colour was white; in some districts the ground colour of the wings assumed a yellowish or buff tint.

Mr. Turner exhibited bred specimens of *Boarmia roboraria*, Schiff., and stated that he only successfully hybernated two larvæ, although they apparently did well till the early part of March. Mr. Adkin related his experience of twenty-five larvæ, sleeved on oak in his garden last autumn, and which, in due course, attached themselves to the twigs for hybernation. All went well till the middle of December, when the heavy gales dislodged them; and although they gradually regained their position, taking advantage of occasional mild days to do so, they did not appear to thrive afterwards, were restless, and did not take to their food well as the spring advanced. Mr. Turner also exhibited *Apamea ophiogramma*, Esp., and a bleached variety of *Epinephele ianira*, L., from Leigh, Essex; he said that several specimens of this form had been taken from the Leigh district within the last few years.

Mr. Allbuary exhibited a lengthy series of *Colias edusa*, Fb., some remarkably fine specimens of the var. *helice*, Hb., and a large specimen of *Deiopeia pulchella*, L.; also two bred specimens of *Vanessa urticæ*, L., in one of which all the

normal red colour was entirely replaced by a beautiful bright yellow.

Mr. Nussey showed some most interesting varieties of *Lycæna bellargus*, Rott., and *L. icarus*, Rott., with the spots on the underside coalesced and forming broad streaks; *Polyommatus phlæas*, L., in which one specimen had only the central spot on the fore wing, and another with the hind wings of a dark fulvous brown; also a banded specimen of *Argynnis euphrosyne*, L., and the pallid form of *Colias edusa*, Fb., var. *helice*, Hb.

Mr. South, on behalf of Mr. Burkill, exhibited some well-executed coloured drawings of *Smerinthus tiliæ*, L. No. 1 represented an insect with pale brown fore wings, marked with reddish spots of the usual shape; hind wings fuscous grey-brown, with some irregular darker markings, and body of the same colour as fore-wings. No. 2 figured an insect with greenish-white wings, with the usual central markings dark green, and some touches of an intermediate shade of green between the central band and the base of the wing, and on the outer third of the wing; hind wings fuscous-brown, outer and abdominal margins paler; the former edged with blackish, and the body of the intermediate green of the fore wings.

Mr. Hawes related his experience of collecting at Felixstowe and Folkestone during the middle of August, and reported the continued abundance of *Colias* and *Vanessa*; whilst *Pieris brassicæ* and *rapæ* were to be seen by hundreds on thistle-heads. At Folkestone, he stated, it was painfully evident that *causa* and *hyale* had been hunted down by the schoolboys, who prowl about the Warren Hills at this time of the year from early morning till late afternoon. Mr. Adkin, referring to Mr. Hawes' remarks on the abundance of the Pieridæ, asked if all the species were represented this season, as he had not seen *napi*; *brassicæ*, he observed, was in abundance; *rapæ* not quite so numerous, and *napi* exceedingly scarce. Mr. Tutt remarked that his son had met with *napi* freely quite recently; and Mr. South said he still had a living pupa which had been in that stage for three months.

Mr. Hawes referred to his remarks at the previous meeting respecting the paleness of the butterflies this season, and said he had again looked over his specimens taken in the New Forest this year, and they confirmed his opinion that they were decidedly lighter in the ground colour but not in the markings.

SEPTEMBER 8th, 1892.

J. JENNER WEIR, Esq., F.L.S., F.E.S., *Vice-President*, in the Chair.

Mr. M. Winkley exhibited a variety of *Catocala nupta*, L., with the normal red colour of the hind wings replaced by pale brown, shot with purple, and closely resembling *C. fraxini*, L.

Mr. Frohawk exhibited *Satyrus semele*, L., bred from ova from a female captured in the New Forest, the series showing great variation in the depth of colouring in both sexes, one female having the underside suffused.

Mr. C. Fenn exhibited a long series of *Cidaria truncata*, Hufn., bred from a female captured at Chattenden, showing three distinct forms: viz., with a whitish central band, a black central band, and a yellow band; the latter, he said, was known as var. *centumnotata*, Fab., (comp. *Abst. Proc.*, 1889, p. 147); and he directed special attention to one specimen of the latter form, the band of which was very pale and had the appearance of being bleached or worn.

Mr. Fenn also exhibited a series of *Calymnia pyralina*, View., from Reading.

Mr. W. H. Tugwell exhibited *Spilosoma lubricipeda*, Esp., var. *radiata*, St., with their Yorkshire parents, and stated that out of some three hundred larvæ which had been fed on *Sambucus niger*, only three had produced moths this season; the remainder would winter as pupæ; whilst the three which emerged had only been in pupa three weeks.

Mr. J. H. Carpenter exhibited a specimen of *Sirex juvencus*, taken in Belsize Park; and Mr. Short also reported its capture at Putney, a specimen having been sent to him from that district.

Mr. Samuel Stevens exhibited a Pyrale, which he stated to be a new species, taken at Totland Bay in June last, allied to *fuscalis*; also typical *Botys fuscalis*, Schiff., and *B. terrealis*, Tr., for comparison. Mr. Fenn thought that the specimen differed from *fuscalis* in the character of the transverse lines. Mr. Frohawk said that he could see no difference between the specimen and *fuscalis*, except its superior size; it certainly had a slightly sharper angle at the upper part of the elbowed line, and some pale patches between the nervures of the hind wings, but both these last characters were shown in one or other of the ordinary specimens of *fuscalis*.

Mr. J. Jenner Weir exhibited specimens of *Vanessa cardui*, L., which he had reared from larvæ collected in July last at Westgate; the chrysalids, immediately after metamorphosis, had been subjected to a temperature of 57° Fahr., which was steadily maintained both day and night, and the result was that the imagines which emerged were all much darker than usual. This was brought about by the black occupying an extended area, and the row of five spots on the hind wings being not only increased in size, but often confluent. He also exhibited a specimen of *Epinephele ianira*, L., taken at Westgate, which had a well-defined ocellus on the upper side of the hind wings. Mr. Frohawk stated that he had never noticed an ocellus on the hind wings of this species before.

Mr. Manger exhibited a Longicorn taken fifty miles at sea, off Borneo, and said it would be interesting to know how they carried their antennæ in flight; also a specimen of *Vanessa cardui*, L., taken at sea thirty miles from Algiers; and a Cicada twenty-five miles off Pointe-de-galle, Ceylon.

Mr. Frohawk exhibited a gnat taken from the neck of a collie dog, and stated that the species was very abundant at Chattenden. Mr. West said that the same species was a regular pest at Plumstead. Mr. Step also made some remarks upon its abundance at Ashtead, and related his experience of the painful swellings it had caused upon his hands, which were only reduced after some days of careful treatment.

Mr. E. Step exhibited living specimens of the Beadlet Anemone (*Actinia mesembryanthemum*), and the Arrow Muzzlet (*Peachia hastata*) from St. Mawes, Cornwall; and made some remarks upon the anemones of that district. The rocks in front of the town, he said, were hollowed into basins, which formed, at low water, admirable collecting or observing grounds. This was so not merely for anemones, but also for littoral mollusca, crustacea, and other classes of marine life. Several species of anemones, however, were very common. This was, of course, especially the case with the Beadlet, which was exceedingly abundant on rocks only covered at high-water, this species liking to spend much of its time out of the water. Next in abundance was the Dahlia Wartlet (*Tealia crassicornis*), chiefly on those rocks which were only uncovered at the ebb of spring tides. These, when fully expanded in a shallow pool, make a grand display, but they are difficult to obtain without injury owing to the base being attached to the rock beneath a considerable

deposit of sand and *débris*. *Sagartia bellis* and *S. troglodytes* were more difficult still to obtain, owing to their choice of narrow fissures in the rock for their homes, the column being elongated in order that the disc could be expanded above. The pink-tipped green tentacled *Anthus cereus* was fairly abundant; also a variety lacking the pink colouring.

Mr. Harry Moore exhibited Orthoptera from Cadiz, viz., *Decticus intermedius*, *D. albifrons*, *Pachytylus cinerascens*, and the blue form of *Ædipoda fasciata*.

SEPTEMBER 22nd, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. Robert Adkin exhibited a short series of *Oxyptilus distans*, Zell., and *O. pilosellæ*, Zell., taken this summer near Dover; also, on behalf of Mrs. Hutchison, of Leominster, a small collection of Micro-lepidoptera from Cornwall, including *Diasemia literata*, Scop., and a remarkably brightly-marked form of *Herbula cespitalis*, Schiff., said to be exceedingly local.

Mr. South exhibited a variable series of *Grapholitha cinerana*, Haw., taken in a field on the border of Middlesex, between Northwood and Rickmansworth. He stated that the species was abundant on the trunks of two grey poplars (*Populus canescens*) at the end of July and first week in August. Mr. South also exhibited *G. nisella*, Clerck., and the varieties *pavonana*, Don., *bæberana*, St., and *rhombifasciana*, Haw., and remarked that although some specimens of the latter species varied in the direction of *G. cinerana* they could always be distinguished by the different shape of the outer edge of the basal patch. Two examples of *petrana*, Hübn.=*cuspidana*, Haw., a form which was generally considered to be a variety of *G. nisella*, were found with *G. cinerana*. As the basal patch of these specimens agreed with that of *G. cinerana*, he was inclined to think that *petrana* was a form of *G. cinerana* rather than of *G. nisella*.

Mr. Fenn stated that both species of *Grapholitha* were abundant on poplars in Kent. Mr. Barrett observed that he had always understood that *G. nisella* was associated with willow, and that its occurrence on poplar was new to him.

Mr. South stated that he had never met with *G. nisella* on poplar, nor with *G. cinerana* among willow.

Mr. Fenn exhibited *Plusia gamma*, L., and a fine series of *Orgyia antiqua*, L., with exceedingly dark forms.

Mr. McArthur exhibited a very interesting case showing the life-history of *Sesia scoliiformis*, Bork., from Rannoch, Perthshire; also *Hepialis humuli*, L., from the Shetlands, with the var. *hethlandica*, Staud.

Messrs. Frohawk and Carpenter exhibited a long series of *Vanessa atalanta*, L. Mr. Frohawk referred to the small white spot in the red band, which was generally thought to indicate the female; but he also showed females without this spot, and one male which had the white spot fairly well defined.

Mr. Carpenter called attention to the abundance of the larvæ of *Vanessa atalanta* on Streatham Common, and remarked upon the variation in size; some were full-fed, whilst others were only in their first skin.

OCTOBER 13th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. James, of Uphill, Folkestone, was elected a member.

Mr. C. Oldham exhibited *Nonagria cannae*, Och., and pupa case, and among many other varieties a male example of *Odonestis potatoria*, L., of the colour of the female.

Mr. B. W. Adkin exhibited examples of *Epinephele ianira*, L., from the Scilly Isles, in which the orange blotch of the fore wings in the males was greatly enlarged, and the fascia in the hind wings of the females very much stronger than he had ever seen it in examples of this species from any other locality.

Mr. C. Fenn exhibited examples of *Lithosia muscerda*, Hufn., from Sandwich, Kent, and a beautiful banded variety of *Acidalia aversata*, L. Also a box full of *Vanessa urticae*, L., selected from some four or five hundred specimens, and stated that they were interesting as showing the amount of minor variation there was in such a species.

Mr. Barrett remarked that it was most interesting to find *Lithosia muscerda* even in small numbers on the South Coast, as it was an exceedingly local species on one portion of the Norfolk Fens.

Mr. C. G. Barrett exhibited a variety of *Argynnis euphrosyne*, L., taken by Mr. Oswald W. Latter at Godalming, in which a large portion of the wings from the base was filled in with black, while the portion showing the ordinary ground colour

was not of the usual full fulvous colour, but paler; a bred series of *Eugonia quercinaria*, Hufn., the females in which were a little richer in colour than usual, and followed the variation in the female from which the ova were obtained. Also specimens of *Hesperia alveus*, Hübn., which he stated had recently been recorded as British. A short time back he was looking through the Rev. Mr. Marsh's collection, and found them in his short series of *H. malvæ*, L., the examples had been taken by Mr. Marsh in Norfolk, and they were intermediate between *H. alveus* and its var. *serratulæ*, Ramb.

Mr. Robt. Adkin exhibited a series of *Dianthæcia nana*, Rott., from the Scilly Isles, together with examples from North Devon and the north of Ireland for comparison, the resemblance between the whole being very close. He also exhibited *Vanessa c-album*, L., and read the following notes: "On 15th June last I received from my valued correspondent, Mrs. Hutchinson, of Leominster, six nearly full-fed larvæ of *Vanessa c-album*, together with some most interesting remarks on their earlier history. Of two hybernated females, taken in the early spring months, one commenced to deposit ova fully a fortnight before the other, and both continued laying for some three weeks until each had produced about a hundred eggs. Some fifty of these turned colour for hatching during a few days when the weather was very warm, and seven of them did produce larvæ; then followed a spell of bitterly cold weather of almost a week's duration, which killed every egg that had changed colour; the young larvæ that had emerged did not, however, suffer any ill effects from it, but took to the food (red currant) with which they were supplied, and fed on steadily; nor were any of the ova that had not changed colour injured by the cold; but on the return of milder weather duly changed colour and produced larvæ, which fed up well, all being hung up for pupation by 14th June, except the six that were sent to me. Of these, five had become pupæ by the 29th, but one continued to feed on for some days longer; and the imagines appeared as follows: July 2nd, 1 female; 3rd, 2, male and female; 7th, 1 female; 15th, 1 crippled; and 23rd, 1 female: a somewhat remarkable specimen, to which I shall refer later. The series that I now exhibit comprise individuals of both sexes of each brood; and it will be seen that the broods are easily separable by the colour of the undersides, which in the first or summer brood is of a light reddish brown shade, while in the second or autumnal brood it is dark brownish grey, one may almost call it slatey, and the males in each case are much more

mottled than the females. Mr. Robson has gone somewhat fully into these differences of the underside coloration in articles in the *Young Nat.*, vol. ii., pp. 108-110, and the *Brit. Nat.*, vol. ii., p. 194. The distinction between the two broods on the upper surface is less striking, but a point of difference that holds good in the majority of instances is the diffusion of the central lobe or tail of the hind-wings with dark brown scales in the second brood. But although the characters referred to may be taken as a general rule for separating the two broods, neither the coloration of the underside, nor the ornamentation of the upperside can be implicitly relied upon for that purpose, as exceptions do occur, of which the female bred on July 23rd is a good example. In this individual the upper surface somewhat favours the peculiarities of marking of the first brood, but the coloration of the underside is distinctly that of the second. Possibly the lengthened period of the pupal stage may have been accountable for the great difference between it and the earlier emergences, for, putting aside the cripple that left the pupa on 15th, and whose wings were insufficiently expanded to decide to which form it belonged, there was a difference of sixteen days between the last previous emergence and this one, and during that time the temperature was abnormally low for the time of year, being on the 16th, 20° below the average. At any rate, the specimen is an interesting example, a retarded individual, of the earlier emergence of a seasonably dimorphic species, assuming the form of the autumnal brood; and I have no previous record of a similar result being brought about in so short a time."

Mr. Barrett said that one of the specimens of *D. nana*, shown by Mr. Adkin, more closely resembled the supposed Irish examples of *compta* than anything he had yet seen.

Mr. Tugwell exhibited a short bred series of *Hypsipetes ruberata*, Frr., from West Hartlepool, showing considerable variation; a variety of *Melanippe hastata*, L., from Abbott's Wood, Sussex, in which the central fascia was reduced to a small spot, and three specimens of *Colias edusa*, Fb., one a very large male taken in Tilgate Forest, Sussex, in June, 1877, and which Mr. Tugwell said was no doubt an immigrant, a very dark female showing the obliteration of the yellow spots in the black borders of the superior wings, and the third having the hinder wings of a rosy magenta pearly lustre.

Mr. Henderson exhibited a specimen of *Deiopeia pulchella*, L., taken by himself at Hayling Island, and reported that another specimen had been captured at Havant about the

same time. Mr. Adye also exhibited two examples of this species, taken at Christchurch, Hants.

Mr. Dennis exhibited a variety of *Lycæna bellargus*, Rott., the ground colour of the underside being whitish grey, and all the spots, with the exception of those at the margins, absent.

Mr. Frohawk exhibited a branch or stem of alder with pupa case of *Sesia sphegiformis*, Fb., protruding therefrom, and stated that the day before the imago emerged the pupa broke through the bark, and remained protruding for a little time in the sun; it then drew back, and emerged the next day (see also Mr. Tugwell's remarks, *ante* p. 39).

Mr. Adye exhibited living larvæ and pupæ of *Colias edusa*, Fb.; and on behalf of Mr. McRae of Bournemouth, two boxes containing examples of *Colias edusa*, Fb., var. *helice*, Hb., and *C. hyale*, L., which Mr. Adye said were a portion of the result of five days collecting in the neighbourhood of Bournemouth and Christchurch, Hants, by Mr. McRae, who estimated the proportion of *helice* to *edusa* females as one in fifty, and of *hyale* to *edusa* as one in one hundred.

The following extract from a letter from Mr. McRae as to why *C. edusa* did not occur abundantly two years in succession, was read:—

"Having observed that the ova of *C. edusa* are always placed on the upper surface of clover blades, I am firmly of opinion that cattle and sheep in grazing fields, and mowing machines in hay-fields, are principal agents in the destruction of the ova and larvæ. An *edusa* year is doubtless due to an exceptionally numerous immigration of the species, but the destructive agents referred to play havoc with the offspring."

Mr. R. Adkin pointed out that the larvæ of *C. edusa* did not always feed on clover, and unless it was confined to cultivated clover he did not see how Mr. McRae's explanation could be the right one; although it might satisfactorily explain a reduction in the numbers, it could not account for the total extermination of the species for the second year. Mr. Hawes thought it was necessary not to lose sight of the fact that, so far as his observation went, the species flew chiefly on railway embankments, and chalk downs; and bearing in mind the number of food plants besides clover, upon which the larvæ fed, he for his part could not see that the prolongation of the species depended upon the cultivated clover. Mr. Auld said that at Hastings he worked the clover fields for some time, and got very few specimens, but found them much more plentifully in the lanes and on the hills.

Mr. C. Fenn said he had at different times taken a good many of this species, and could confirm what Mr. Adkin had said ; he had always seen the greatest numbers in very rough fields, with but little clover growing in them ; it also swarmed on railway-banks, but it was the custom to mow these once a year. He was of opinion that the failure of the species to maintain its holding in the country was rather due to the unsuitable climate than to the eating of ova and young larvæ by cattle and sheep, as in the rough fields and many other places sheep and cattle never went at all. Mr. Tugwell said that in many cases *edusa* occurred very freely in clover fields, and he gave an instance of having once met a man in a clover field who had adopted the device of pinning half-killed females of the species on the clover heads, and then netting the males as they flitted around, and in this way the man stated he had taken over fourteen dozen. Mr. J. Jenner Weir also said he had seen and taken them plentifully on one occasion in a clover field near Lewes, and did not see a single specimen anywhere else. Mr. West of Greenwich also made a statement to the same effect. Mr. Tutt said he could see nothing whatever in Mr. McRae's suggestion, because the eggs of many other species were laid where cattle and sheep fed, and yet they did not disappear as *edusa* did ; he considered the whole question was one of temperature, and in 1887 the failure of the thousands of *edusa* to reproduce their species was due to climatic conditions ; the habit of the species was to hybernate, as on the Continent, and they failed in doing this in consequence of the cold, which killed them. He did not believe that in ordinary years the females attempted to deposit ova in the autumn ; but, if they survived the winter, would do so in the spring. Mr. Frohawk concurred with Mr. Tutt in his views, and thought that the cause given by Mr. McRae was totally inadequate to account for the disappearance of the species ; even after the clover fields were cut he had taken freshly emerged females, and as the clover was then growing afresh there would be plenty of food for the larvæ ; in his experience of breeding the species he had ascertained that the larvæ would not feed during cold weather ; it had also to be borne in mind that clover grew on every piece of waste land. Mr. C. G. Barrett thought there was a great deal of reason in what Mr. McRae had said, because even though the clover grew after it was cut, it was the invariable rule in this country to feed it down again in the winter ; but an important element in the matter was the enormous quantity of clover and the other food plants of the

larvæ which grew in all sorts of wild places, grassy spots among stones in lanes, and were practically never eaten down at all; and bearing this in mind, the cause suggested by Mr. McRae would not account for the total disappearance of *C. edusa*. Mr. Weir asked whether he understood Mr. Tutt to say that *C. edusa* never hybernated in this country, and in reply Mr. Tutt said there were one or two records of it having been taken early in the year, but they were solitary examples.

OCTOBER 27th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. Hugh Main was elected a member.

Mr. Bristowe exhibited *Zygæna trifolii*, Esp., intermediate between the normal form and the yellow variety; also a variety of *Argynnis paphia*, L., taken at Brockenhurst, Hants, in which the spots had coalesced and formed streaks.

Mr. R. Adkin exhibited *Odonestis potatoria*, L., bred from larvæ collected in Sussex, the series showed considerable variation, and he also called attention to the wings of some of the females being much scalloped, but still retaining complete fringes. Other instances of like malformations were referred to by several members.

Mr. C. Fenn exhibited *Tortrix rosana*, L., from Aberdeen and Eltham, and remarked that there was some doubt as to the examples from Aberdeen being referable to this species, but Mr. Barrett was of opinion that they were correctly named.

Mr. C. G. Barrett exhibited two specimens of *Nonagria concolor*, Gn., one taken in the Yaxley Fen district thirty or forty years ago, the other recently captured in a locality in the Midland Fen district, and forwarded by Dr. T. D. Wheeler. With these for comparison, specimens of *N. hellmanni*, Evers., *N. fulva*, Hb., *N. bondii*, Knaggs., and *Miana arcuosa*, Haw., showing the specimens in those species which approach closely to *N. concolor* in colour.

Mr. Tugwell stated that this year he had reared some eight or nine examples of the Paisley *Eupithecia*, and which he believed to be a form of *E. castigata*, Hb., from larvæ fed on heather, both the leaf and the flower being eaten; all the specimens were certainly black, but some were darker than others, and the whole of them had comparatively little marking. He understood from his Paisley correspondents, however, that these dark pugs were invariably found on pine trunks (see also *ante*, p. 21).

Mr. Carpenter stated that an example of *Vanessa atalanta*, L., had been caught flying in Upper Thames Street, City.

Some discussion took place as to whether *Colias edusa*, Fb., hybernated in the larval stage in this country, and Mr. Hawes stated that he had reared ten specimens from ova laid on 15th August. Mr. Frohawk said he had larvæ of this species feeding indoors, and so far as he could see they would not hibernate, but all the larvæ that he had had feeding out of doors died off. Mr. C. Fenn said he had never seen a freshly-emerged specimen before June. Some further observations were made as to the imago being reduced in size if fed up rapidly; but Mr. Frohawk did not concur, stating that the examples of *C. edusa*, taken by him in June, were smaller than those reared from them.

NOVEMBER 10th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. Billups exhibited the curious dipteran, *Stratiomys potamida*, Mg., and its rare hymenopterous parasite, *Smicra sispes*, Sp., one of the very numerous species of Chalcididæ. Both these insects were captured in the Plumstead Marshes, June 25th, this year.

Mr. H. Williams exhibited living larvæ of *Colias hyale*, L., and stated that he had already obtained one pupa.

Mr. Mera exhibited varieties of *Lycæna icarus*, Rott., from Felixstowe; *L. bellargus*, Rott., from Folkestone, and *Abraxas grossulariata*, L.

Mr. W. F. de V. Kane exhibited a box of Irish Macro-Lepidoptera, of which the following were the most notable and commented on. *Stauropus fagi*, L., from Kerry, a first Irish record. *Notodonta bicolor*, Hb., from a new locality in Kerry; and Mr. Kane stated that he had good reason to think that it might be more numerous there than at Mucross. *Dianthæcia luteago*, Hb., var. *barrettii*, Dbl. bred.

Boarmia cinctaria, Schiff., from Killarney (one male and two females), with very white bands and pale ground colour. He said these specimens were the extreme form, but that his series from Killarney showed a decided tendency to paleness in comparison with those he had seen from the New Forest. Also that in the extreme north of Donegal, he had noticed a similar character, and in the only Sligo specimen he had taken it was very distinctive. He failed, therefore, to see that this species was influenced by either damp or cold in the direction of melanism; the forests of Killarney being at least as

warm and probably far damper than the New Forest; while Donegal was comparable for climate with the Scotch highlands. Mr. Tutt suggested that the female was always paler than the male, but Mr. Kane assured him that the ochroleucism was equally represented in both sexes in his Irish series.

Bryophila muralis, Forst., one typical example and two specimens of var. *par*, Hb. Mr. Kane stated that Mr. Warren had recognised these as similar to his *B. impar*, from Cambridge. The three exhibited were taken at the same locality in Co. Cork; and the variety existed, together with the type, in considerable numbers, and exhibited every gradation from the pallid almost obsolete form to the very dark suffused specimen shown. Mr. Barrett and other members expressed their opinion that the latter was the darkest specimen they had ever seen.

Xylocampa areola, Esp., two specimens, one extremely dark, with the light markings very purple, and the other of a very pale grey brown, with pale stigmata and band. These Mr. Kane said were taken, probably emerged, in the same locality in Co. Wicklow. *Eupithecia togata*, Hb., with strongly marked characters. *E. venosata*, Hb., very melanic, markings, almost obsolete. *Xylophasia monoglypha*, Hufn., *Agrotis lucerneae*, L., *Hadena oleracea*, L., and *Camptogramma bilineata*, L., from Kerry. All these were from one particular locality, and the only Heterocera Mr. Kane had taken there. All were very dark, the *H. oleracea* least affected, but still remarkable, and the *C. bilineata* with black fore-wings and sepia coloured hind-wings. He stated that the exhibit was not so much remarkable, in his opinion, from the individual characters of the insects, though the *C. bilineata* was undoubtedly a new form and worthy of a varietal name, but because collectively they offered evidence of common influence toward a dark coloration. Of the latter insect he had about fifty, all of which were similarly coloured; but among some fifty or sixty *monoglypha* there were five or six of the ordinary greyish-brown coloration.

Mr. Barrett agreed with Mr. Kane in the interesting nature of this exhibit, and especially in the surprisingly dark form of *C. bilineata* shown, but said he had often seen English specimens of *H. oleracea*, as dark as the Irish examples shown.

Other insects exhibited were *Melanippe montanata*, Bork., *Odontoptera bidentata*, Clerck., *Boarmia repandata*, L., *Tephrosia biundularia*, Bork., Esp., which Mr. Kane stated occurred

in May and June, both in the north and in Kerry, and he doubted if the earlier brood existed in Ireland.

Mr. Purdey exhibited a specimen of *Colias hyale*, L., taken at Folkestone in 1891, beautifully banded forms of *Cidaria suffumata*, Hb., long series of *Cidaria truncata*, Hufn., including some beautiful varieties: the whole series had been reared from ova, the larvæ having fed up on the wild strawberry, long series of *Peronea comariana*, Zell., remarkable for their close resemblance to *P. variegana*, Schiff., and specimens of *Eupithecia stevensata*.

Mr. C. G. Barrett, said that some lepidopterists did not consider the last-mentioned insect a distinct species; the examples first taken were referred to *E. ultimaria*, Bdr., Dup., but they were now thought to be a peculiar white form of *E. sobrinata*, Hb.

Mr. Purdey in reply stated that they did not occur at the same time as *E. sobrinata*. Mr. Webb had obtained ova; but the larva would not feed or even attempt to do so on juniper, although there were a few juniper bushes where it occurred. It was generally taken at the flowers of golden rod; and both he and Mr. Webb had been unable to get the larvæ from juniper, but Mr. Webb had once found a specimen drying its wings on the flowers of the golden rod. The perfect insect appeared about the middle of September.

Mr. R. Adkin exhibited *Hypsipetes sordidata*, Fb., bred from larvæ taken on bilberry, near Sevenoaks, Kent. The series included forms showing various modifications of a well-defined whitish central fascia; others in which this marking was absent; some in which the most prominent ornamentation was an almost straight serrated band near the hind margin, black in some cases, and white in others, and varying in length from almost the entire width of the wing to little more than a dot. When the above larvæ were taken nearly full fed, those on the willow at the same place were not one fourth of an inch in length. *Melanippe fluctuata*, L., taken at Lewisham during the present year, including an example of unusual size, in which the median area of the central fascia was occupied by the pale ground colour of the wing, and the remainder of the wing much more shaded than usual. Also a somewhat similar specimen taken in the same locality in 1868.

Mr. R. South also exhibited examples of *Hypsipetes sordidata*, Hb., bred from larvæ beaten from a hedge-row, composed principally of hazel, with here and there a few hawthorn

bushes, but certainly no sallow ; although the series was a short one, it comprised modifications of almost every known form of variation in this species.

Mr. South also exhibited bred examples from several broods of *Coremia unidentaria*, Haw., and *C. ferrugata*, Clerck., and contributed a short paper (p. 69).

Mr. Goldthwait mentioned that from a captured female of *C. unidentaria*, taken in June, he had obtained ova, and the larvæ had fed up, but so far he had only bred a few imagines, and these were certainly exactly like the parent, and showed no trace of resemblance to *C. ferrugata* ; but he would, of course, be better able to speak when the remainder of the brood emerged. He had also bred a lot of *C. ferrugata*, and he did not find they showed any trace of approaching *C. unidentaria*.

Mr. C. Fenn said he had constantly found, on rearing these two species, that they bred true, and he had never obtained an intermediate form ; and in his opinion he considered they were distinct, although they occurred at the same time of the year, and were both double-brooded. He never had the slightest hesitation in referring those with the black fascia to *C. unidentaria*, and those with the red fascia to *C. ferrugata*. Mr. Fenn added that he did not think it would be possible to distinguish between the larvæ of the two species.

Mr. Tutt concurred in the view that both species were distinct, and referred to the opinions arrived at by Mr. Pearce and Mr. Merrick, who, from an examination of the genital organs of the two species, had come to the conclusion that they were undoubtedly distinct.

Mr. R. South exhibited a very curious aberration of *Vanessa atalanta*, L., taken in Jersey ; the scarlet band of the superior wings being broken up at the end, the usual short white band from the costa being absent, as also were the black spots from the red band on the inferior wings.

NOVEMBER 24th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair

Mr. Jenner Weir exhibited specimens of *Pyrameis cardui* which he had received from Larimie County, Colorado, captured at an elevation of upwards of 7,000 feet ; these, if they had been obtained in Australia, would undoubtedly have been deemed to be *Pyrameis kershawi*, the three blue pupils to the ocelli or the lower wings being even more strongly marked than in that sub-species. One of the latter, also shown, had

the white spot between the first and second median nervules well developed, as was sometimes the case in *Pyrameis atalanta*, and always so in *P. huntera*. Thus these three species were linked together by a very insignificant dot; always present in one species, and occasionally appearing in the other two.

Mr. F. W. Frohawk exhibited a bred series of *Smerinthus tilia*, L., showing considerable variation in extent of markings and depth and hue of colour, one specimen being a remarkably rich red form. Mr. J. Jenner Weir remarked on the way the series were arranged, showing the gradual passing of the green into the red form.

Mr. Dennis exhibited a very dark form of *Vanessa cardui*, L., taken in S. W. Berks, 1892, and examples of *Colias edusa*, Fb., reared by him from ova obtained from a female captured in August; the larvæ pupated in September, and the first imago emerged on 13th November.

Mr. R. South exhibited examples of certain malformations in Lepidoptera, and read the following notes thereon:—

No. 1. *Papilio machaon*, L.—The malformation in this specimen consists of an unnatural rounding off of the apex of the left fore-wing and a shortening of the tail of the left hind-wing. With regard to the short tail, this in itself, and if it affected both hind-wings, would not be considered a malformation, as there is a race of *P. machaon* inhabiting Kashmir with exceedingly short tails.

No. 2. *Melitæa athalia*, Rott.—In this example the right hind-wing only is shorter, but it is interesting to note that the markings are almost identical, spot for spot, with those of the fully-developed left hind-wing. The right antenna, however, appears to be somewhat shorter than the left one.

Nos. 3, 4, and 5.—Here we have a short series of malformed specimens of the same species, *i.e.* *Lycæna bellargus*, Rott. The first example (No. 3) has the left hind-wing reduced to about one-half its proper size, but there is no indication of any crumple or crease, and I cannot detect any fault in the neurulation; the fringes are perfect, but slightly narrower than on the normal right hind-wing. The ocellation of the under-surface of this ill-formed wing is, however, aberrant, and does not agree with that of its fellow.

The second and third specimen of *bellargus* may be taken together as they each exhibit the same kind of malformation, but on opposite sides. Thus we find that the outer margin of the left fore-wing of No. 4 and the right fore-wing of No. 5 is slightly concave below apex, and that the apex itself is in

consequence distinctly acute; the left hind-wing of No. 4, and the right hind-wing of No. 5 have the middle of their outer margin slightly concave. The aberration in contour of the wings does not seem to have caused any modification in the markings of the wings affected.

No. 6. *Lycæna icarus*, Rott.—Another example of aberration in shape of one pair of wings unaccompanied by alteration in the markings of those wings.

No. 7. *Tortrix piceana*, L.—This specimen emerged from the pupa with three wings only. The right hind-wing is quite absent, and I cannot find any trace or vestige of any such organ on this side of the specimen. I should mention that all the legs are perfectly developed, and, with the exception of its being short of one hind-wing, I fail to find that the insect is abnormal in any other respect.

With regard to the probable cause of these interesting abnormalities I will not now venture to offer an opinion, but when this subject was last before us I think that it was suggested that malformations of this kind were probably caused by some injury to the larva. I am inclined to believe that this will prove to be the true explanation of these misshapen specimens, but the fact can only be clearly and convincingly demonstrated by careful experiment. I must add, however, that, at the present moment, I do not quite see how such a line of investigation can be satisfactorily conducted.

Mr. H. Williams exhibited a pupa of *Colias hyale*, L., obtained from one of the larvæ shown by him at the last meeting.

Mr. Tugwell exhibited a series of *Dianthæcia luteago*, Hb., var. *barrettii*, Dbl., some of the specimens having been bred by him, and others captured at Howth.

Mr. R. Adkin exhibited *Zygæna filipendulæ*, L., from north-east Essex, showing gradations of colour intermediate between the red and yellow forms. *Peronea rufana*, Schiff., bred from *Myrica gale*, and *P. hastiana*, L., bred from sallow from Sutherlandshire, the latter including a number of very distinct forms.

Mr. C. G. Barrett referred to one of the specimens of *P. hastiana*, which was deeply suffused with a peculiar bluish-grey colour, and said he thought it was the first he had seen of this variety.

Mr. C. G. Barrett exhibited unicolorous dark examples of *Acronycta leporina*, L., reared by Mr. Joseph Collings of Warrington, and a white variety of *Triphæna pronuba*, L., taken by Mr. W. Holland at Swansea.

Mr. Frohawk stated that he considered *Colias hyale*, L., hibernated in the larval stage, as those he had had feeding did not continue doing so after the third moult, when they were about half an inch long; they were placed on a window-sill where the temperature during the day was about 50° , but at night fell nearly to 40° . He had tried to induce the larvæ to feed by placing them for about three or four days in the sunshine; but with the exception of one moving slightly it had no effect, and since then none of them had moved at all. Mr. Herbert Williams added that some of his larvæ had behaved in an exactly similar manner.

Mr. Hawes remarked that *Hesperia lineola* Och., and *H. thaumas*, Hufn., passed the winter in the egg stage.

DECEMBER 8th, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. W. Farren exhibited four aberrations of *Papilio machaon*, one being minus the second discoidal nervule in both anterior and posterior wings, and consequently one of the submarginal lunules was absent from each wing; one specimen had the central costal blotch broken and partly merging into the basal patch, and a black line almost uniting it with the costal blotch beyond the centre. In one specimen there was a black spot in the yellow space between the basal patch and central costal blotch; and in another example the submarginal band was so broad as to partly enclose the discoidal cell, and considerably lessen the size of the yellow submarginal lunules. He also exhibited a series of very dark brown and black varieties of *Chauliodes chærophyllellus*, Goze., and some *Nepticulæ* pinned with very fine silver pins (Minutien nadeln), and put on strips of soft pith, the pins being too thin to go into cork without bending—silver pins being better than the so-called steel ones, which rust.

Mr. Frohawk exhibited, on behalf of Mr. F. Merrifield, specimens of *Pieris napi*, L., *Polyommatus phlæas*, L., and *Vanessa atalanta*, L., the pupa having been subjected to various temperatures. Mr. Frohawk stated, with reference to the last-named species, that those specimens which had been kept in a very hot summer temperature, 80° to 90° for six days, had the ground colour of rusty-black, and the under surface uniformly brownish. Those subjected to a cool summer temperature, 54° to 64° , from eighteen to forty-four days, were typical both on the upper and under sides. Others which had been under a spring and autumn temperature of

51° for fifty to fifty-six days, had lighter red bands, under-side black, and the lighter markings intensified, making a contrast of light and shade. Those subjected to cold spring or autumn temperature of 45° for thirty-two to forty-seven days, and subsequently to various temperatures from 54° to 90° for six to twenty-four days, showed a suffusion of the white scales across the black, between the red band and largest white apical blotch, and were sprinkled, but in a lesser degree, over the apex; the red band on the primaries was broken up into four portions and considerably narrowed, especially in one specimen. Another specimen had the bands or primaries blotched with white; whilst in another the secondary bands were ochreous.

Mr. Hawes exhibited the two forms of *Pieris napi*, L., both bred from the same ♀ parent; also examples of the same species bred from larvæ which had been fed on different food plants. He stated that specimens from larvæ reared on hedge garlic and horse-radish were nearly all lighter than those from larvæ fed on mignonette and watercress.

Mr. Elisha exhibited two drawers, one of *Coleophora* and the other of *Nepticula*, showing the larval cases underneath each species and labelled to show the time of appearance, food plant of the larva, and other data. Mr. Elisha stated that he had adopted this system for the whole of his collection of the Tineina.

Mr. Frohawk exhibited living larvæ of *Carterocephalus palæmon*, Pall., and stated that the food-plants were generally given as *Plantago major* and *Cynosurus cristatus*, but this example was hybernating on *Bromus asper*, L.

Mr. R. South exhibited a female specimen of *Eriogaster lanestris*, L., bred by him, and which on taking off the board he noticed had ova showing between the segments of the abdomen; it was quite possible that the ova had been fertilised, as there were two males in the cage at the time the female emerged. Mr. Barrett expressed an opinion that the ova were showing through a transparent membrane; but Mr. Weir said the eggs appeared to him to have ruptured the integument.

Mr. Tutt exhibited, on behalf of Dr. Chapman, examples of several species of the genus *Taniocampa*, taken from pupæ which had been cut open, so as to show the development of the imago at the time of opening them. Mr. Tutt stated that pupæ had been opened in some cases as early as the 25th October, and in all cases the moths were found to be fully developed and ready to emerge.

Mr. Barrett said that in the south the whole of the genus were pupating about the end of May, but a little further north they did not pupate until June; as far as he knew, they never appeared as a second brood, and it was curious that they should lie through the whole heat of the summer and not emerge till the following spring. He could not agree that the moths taken from these opened pupa were fully developed, and he doubted much whether they could be said to be actually ready to emerge until they really did so.

Mr. Billups said that *Osmia rufa* actually emerged from the pupa, and remained in the clay cells until the spring. If the cells were broken open before the spring they would fly away; but if left alone they never came out of the cells until the first fine day in March or April.

DECEMBER 22nd, 1892.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. H. Williams exhibited two male specimens of *Colias hyale*, L., bred this year from ova obtained from a female of the species taken at Northfleet last September. Mr. Barrett congratulated Mr. Williams upon his success in rearing this species, which, so far as he knew, was the first occasion it had been bred in this country.

Mr. W. H. B. Fletcher exhibited a long series of *Psilura monacha*, L., and stated that the ova from which they were bred were deposited by a normal female in 1887, and were given to him by Mr. Tate. By careful selection he had at last obtained a dark race, and had no doubt that in time perfectly black specimens would be produced. In 1888 the specimens were nearly all of them normal: the darkest parents were selected from this brood, and the following year produced banded specimens; and on breeding from these the specimens obtained were suffused on the outer margin, and in 1891 and 1892 they were almost black.

Mr. Tugwell said the black form occurred occasionally at West Wickham, Kent, he having taken it there. Mr. R. Adkin pointed out the differences between British specimens and those from the Continent—the latter having a smoky brown-coloured ground, approaching *Ocneria dispar*, L., whilst in the former the ground maintained its normal lightness, but was in many cases much obscured by a black suffusion.

Remarks on *Pieris Napi* and Allied Forms.

By J. JENNER WEIR, F.L.S., F.E.S., etc.

Abstract of paper read February 11th, 1892.

The object of the Exhibition was rather to show the effect of environment and season of emergence on the intensity of coloration, both on the upper and under side of the wings. In the ordinary form of *Pieris napi* the male is usually almost pure white above, with faint greyish tips to the wings; the female has the wings more suffused with greyish scales, and with three well-developed greyish spots on the upper, and one at the costa of the lower wings; underneath, both sexes have the nervures and nervules with dark scales running densely along their course, the upper wings being white, with yellow tips, and the lower wings yellow. In the form which appears during the summer, the male is white, with well-marked greyish tips to the upper wings, and a black spot between the second and third median nervules; the female has the markings of a deeper black, and an additional mark between the sub-median nervure and the lower median nervule; the underside of the lower wings in both sexes have very much less of the dusky scales on the nervures; the ground colour of the wings in the male are lemon-coloured, and that of the female yellow. The differences between the colour of the two emergences may be summed up thus: the male of the spring form is lighter above and darker underneath than the same sex of the summer emergence, and the female of the spring form is less black above, though more dusky, and much darker below than the female of the summer emergence.

Some specimens from Cavan, which had been taken in August, also showed deep black markings, and the nervures of the female, even on the upper side, were black; the under sides were darker than usual in English examples. At the same time that these were taken a *bryoniæ* was found with them, also exhibited; this was the more remarkable because that variety is more nearly like the spring than the autumnal emergence of the species. As further illustrating the subject, a female from St. Petersburg of the spring emergence was shown, which had the whole of the nervures of both wings above conspicuously marked with dusky scales, and a female from the same place, of the summer emergence, which was almost as free from dusky scales on the under side of the hind wings as a *Pieris rapæ*.

Specimens as large as *Pieris brassicæ* were shown, of the variety or sub-species *P. melete*, from Western China, taken at a height of 1,700 feet, in July; the males, except in size, differed but little from the ordinary form, but the female had the nervures deeply edged with dusky scales, and the whole of the wings suffused with grey, and an additional spot between the second and third median nervules on the upper side of the lower wings. Specimens of the closely allied *Pieris oleracea*, from Moose Factory, had the males nearly

white above, and the females with the markings very faintly developed; but underneath each sex had the nervures strongly edged with dusky scales. Mr. Weir then remarked on the great difficulty there was in generalizing on the subject of the factors in the production or suppression of markings, and in the intensity of coloration.

As had been shown, the male of *Pieris napi* had the spring form, with the upper side whiter and the under side darker than the same sex of the later emergence; then the females of the spring form were certainly lighter above and much darker underneath than those of the summer emergence. The Cavan specimens, coming from a district full of lakes, with a climate not very genial, and the soil mostly "a stiff clay, cold and watery," were quite as distinctly black and white in the later emergence as those of that horæmorphic form in England.

At the same season of the year, the specimen of *bryoniæ* had been taken, which was not a dusky form of that variety, but having the ground colour quite as yellow as in the type. Then the closely allied *Pieris oleracea*, from a dreary district on the damp shores of Hudson's Bay, where the snow covered the ground for nearly two-thirds of the year, were remarkable for their whiteness, particularly in the females, which but faintly showed spots.

The *Pieris melete* found some 15° to 20° further south, both in Japan and China, has the nervures more broadly edged with dusky and the intervening spaces more suffused with dusky scales than the European form, although it is evident from the very large size of the specimen, $2\frac{1}{2}$ inches in expanse, that the climate is a genial one in which it has been developed.

There is one generalization that has been placed beyond doubt, and that is, that, if the chrysalids, which in the ordinary course would produce the summer form *Pieris napi* v. *napææ*, are subjected to cold, then the result is that the dusky spring form is produced. So long ago as 1873 Dr. August Weismann made the experiment of subjecting numerous specimens of *P. napi*, which should have produced the summer form, for three months to a temperature of $29\frac{3}{4}^{\circ}$ Fahrenheit, and on 11th September placed them in a hot-house, when, between September 26th and October 3rd, 60 butterflies emerged, the whole of which, without exception, and most of them in an unusually strong degree, bore the characters of the spring emergence: the temperature of the hot-house was 59° to 86° F., yet some of the chrysalids hybernated, and produced in the following spring the form characteristic of that season of the year, thus, to put it into Weismann's own words, he "succeeded, with the *Pieris*, in completely changing every individual of the summer generation into the winter form." *

One of the most unlooked-for cases of retardation of emergence and change of type is recorded by Weismann. He states that he

* Those who wish to pursue this interesting subject further will find much instruction in Professor Meldola's translation of Professor Weismann's "Studies on the Theory of Descent," published by Sampson Low & Co., London, 1882.

changed his residence, and travelled with the pupæ and caterpillars in the course of transformation of the summer brood of *Pieris napi*; and although this brood of that species, under ordinary circumstances, always emerges in the summer, generally in July of the same year as the form *naphæa*, yet none emerged in that year. They were kept during the winter in a warm room, and the first butterflies emerged in January, 1873, the remainder following in February, March, and April, and two females not until June; all appeared, however, as exquisite winter forms. The whole course of development was precisely as though cold had acted on the pupæ.

Notes on the Wet and Dry Seasons forms of certain species of Rhopalocera.

By J. JENNER WEIR, F.L.S., F.E.S., etc. Read February 25th, 1892.

At the last meeting of the Society I pointed out that the imagines of the spring emergence of *Pieris napi* on the upper side are more dusky, and on the under side darker than the form of that species, variety *naphæa*, which appears in summer, and also that the latter had on the upper side the black blacker and the white whiter than in the spring form; and, further, that if the chrysalids of the latter had their emergence retarded, they emerged as imagines of the true *P. napi*, and not as the variety *naphæa*. At the same time I should be prepared to occasionally meet with the form *napi* in the summer, because it is no uncommon fact, well-known to most of us, that the development of lepidoptera, both in the larval and pupal state, is often retarded, and sometimes accelerated, so that a rule without any exception cannot be insisted on.

I now wish to draw your attention to another class of facts, which, unfortunately, I am not able to illustrate by familiar British insects because our climate does not afford the necessary conditions. In the Indian region it is now placed beyond doubt that many species which were looked upon as perfectly distinct are wet season and dry season forms of the same insect.

I have brought for the purpose of illustrating this very interesting subject, specimens of the wet and dry seasons forms of *Junonia asterie*, Linn., and *Junonia almana*, Linn., belonging to the Nymphalinae. It will be seen that in *asterie*, the wet season form from Hong Kong, the upper wings are obtuse and the lower slightly produced at the anal angle, and the upper and lower wings have well-developed ocelli on their under sides. In the dry season form, *almana*, the upper wings are far more falcate, and have a highly developed angle at the end of the upper radial nervure, and a lesser angle at the end of the first median nervule, the lower wings have the anal angle

much produced ; on the underside of both wings the markings, and especially the ocelli, are obsolete.

In many parts of the Indian region, where the wet and dry seasons are not very distinctly marked, only the ocellate form *asterie* is found ; this is the case both in the Malayan Peninsula and in Ceylon, from which island I exhibit three specimens, which I obtained from the Colonial Exhibition of 1883.

It is not known to be the case in any part of the Indian region that the dry season form only occurs, but I have received that form from Graham's Town, South Africa, where it has probably been introduced, and it will be interesting to ascertain whether in that much dryer district the *almana* form only will be perpetuated ; on this subject I have written to Mr. Roland Trimen for information.

The other illustration of this differentiation is taken from another of the sub-families of the Nymphalidæ, the Satyrinæ. I exhibit specimens of the wet season form of the species *Melanitis ismene*, Cram., and the dry season form of the same, *Melanitis leda* ; the specimens of each form from Ceylon show that, though the preceding species of *Junonia* was not differentiated in that island seasonally, yet this species of *Melanitis* most decidedly is so. It will be seen at a glance that the wet season ocellate and feebly angulated form differs from the non-ocellate and angulated form precisely in the same manner as that found to obtain in the *Junonia* belonging to the Nymphaliniæ.

The specimens from Hong Kong of each form, also exhibited, vary in precisely the same manner as the *Junonia*. The late Bishop Smith, of Victoria, Hong Kong, most kindly gave me the insects, which he stated were taken in his garden ; so that the common origin of both forms of the *Junonia* and *Melanitis* is well assured so far as that locality is concerned.

That the two forms of *Melanitis* under consideration are seasonal varieties, or, as I term it, horæomorphic of one species, has been set at rest by direct experiment. Mr. W. Doherty, the distinguished American naturalist, writes in the *Journal of the Asiatic Society of Bengal*, vol. lviii., part ii., No. 1, 1889, that he succeeded in the early part of the dry season, in the island of Sumbawa, in breeding both *Melanitis leda* and *M. ismene*, from the eggs of *M. leda*, by keeping a wet sponge in the box in which the form *M. leda* was reared from the larvæ.

With regard to the colour of the undersides, the wet season form of *Junonia* (*asterie*) is invariably very much lighter than the dry season form (*almana*). In the case of the *Melanitis* the colour of the undersides varies very much, the species being both African and Indian ; but I am disposed, upon the whole, to think that the ocellate form *M. leda* is, as a rule, generally greyish, and the non-ocellate dry season form *M. ismene* is brown, often of a rich chocolate colour. Still, I have seen the latter form greyish ; but so far as my own observation goes, it never has those minute delicate strigæ which, so

to speak, are stippled over the whole of the undersides of the wings of the wet season form *M. ismene*.

To sum up, the wet season form of the *Junonia* is, on the under-side, decidedly much lighter than that produced in the dry season, the upper side presenting no difference; the wet season form of the *Melanitis* is, on the under side usually greyish, and lighter than the dry season form, which latter is generally brown, sometimes even of a rich chocolate; the upper side presenting little or no difference in the two seasonal forms.

I may add, in conclusion, that there are several genera of Eastern Satyrinæ which are horæomorphie, and in which the two forms are differentiated in a similar manner to that dealt with. I think it possible that a careful investigation of some of our own species of Satyrinæ might establish some connection between the humidity of the locality with an ocellate form, in such species as *Cænonympha typhon* and *Epinephele hyperanthes*, and the converse in dry districts.

Notes on the Cocoons of *Eriogaster lanestris*, L.

By R. ADKIN, F.E.S. Read February 25th, 1892.

It will be remembered that Mr. Poulton had, after many experiments, come to the conclusion that the light colour of the cocoons of this and many other species was due to special environment at the time of construction (*Colours of Animals*, pp. 144-45; *Proc. Ent. Soc. Lond.*, 1887, pp. 1, li); on the other hand, Mr. Bateson had sought to show that it was affected rather by the larvæ having become sickly or been subjected to undue disturbance at the time of its forming its cocoon (*Proc. Ent. Soc. Lond.*, 1891, p. xxxvii; and *Trans. Ent. Soc.*, 1892, p. 45). Mr. Poulton, with the assistance of Professor Meldola, had further investigated the manner in which the cocoons were constructed, and had established the fact that they were chiefly composed of calcium oxalate, secreted by the malpighian tubules of the larvæ, and plastered on a very open framework of silk previously constructed (*Proc. Ent. Soc. Lond.*, 1891, p. xv).

On the occasion of this Society's excursion to Eynsford, on 20th June last, I took two nests of larvæ of this species from blackthorn bushes, the larvæ were then about $\frac{3}{4}$ to 1 inch in length, and on reaching home I put the nests, with the larvæ in them, in large green leno bags on growing trees in my garden; the one on whitethorn, the other on wild plum. This food lasted them for some weeks; but upon their approaching full growth the supply began to run short, and they were moved to fresh trees, this time both on plum, and from time to time, as the food ran short, they were moved to fresh branches until they eventually pupated; an abundance of

fresh leaves then remaining in the bags. They were, in the one case, surrounded by the leaves on the other branches of the trees, but fully exposed to the sunlight, the bag being attached to one of the topmost branches of the tree; but in the other case, the bag was partially shaded by a wall. On taking the bags down I found that the cocoons were similarly placed in each, the majority among the old nests and débris that had fallen to the bottom of the bag, but some few were constructed between the folds of the leno. The cocoons varied greatly in colour, some being of an ashy bone colour, others very dark brown, and various shades between these two extremes; but I could trace no connection between the colour of the cocoon and its immediate surroundings; both light and dark cocoons were in the folds of the leno, and among the débris, and, indeed, in some instances, I found light and dark cocoons almost touching each other. Nor can I suppose that the larvæ were subjected to any undue amount of disturbance beyond what was occasioned by the removal of the bags from one branch to another, and this was reduced to a minimum by the old branch being gently cut off and the bag slipped over a fresh one, an operation that did not take long to perform at the time when the cocoons were being constructed; the cocoons were therefore made under conditions which in this respect would pertain to larvæ in a wild state, yet, so far as I am aware, cocoons of this species so light as some of those exhibited are of exceeding rare occurrence, if not altogether unknown, in a state of nature.

The remaining hypothesis, that light-coloured cocoons result from the larvæ having become sickly, is not so easily answered; that in this case they had an abundant supply of food during the latter part of their existence is certain, but that they may have been on short commons in some of their earlier stages is probable, as the bags were not moved to fresh branches until the old ones were stripped of their leaves, and this may have allowed the larvæ to remain without food for some hours. Then again, it will be remembered that, the summer of last year, during which these larvæ were feeding, was abnormally wet, and larvæ enclosed in a bag of ever so light a material, would be likely to feel the effects of wet more, and to derive less advantage from the invigorating effects of the sunshine, than those fully exposed, and, for this reason, they may have been to some extent sickly. No doubt such a state of affairs would affect some individuals to a greater extent than others; and thus, while the most robust would be able to form normal cocoons, the more sickly would be unable to perform their full functions, and would produce imperfect (or diseased) cocoons, the particular form of imperfection in this case being in point of colour; and I am supported in this view by the fact that some of the lightest coloured of them were of slighter construction than any of the dark ones.

These results therefore appear to support Mr. Bateson's theory; at the same time I fail to see that they are antagonistic to the views

advanced by Mr. Poulton. Mr. Poulton has shown that larvæ placed among white surroundings produced light-coloured cocoons. Mr. Bateson obtained similar results without the white surroundings, but with larvæ under unnatural conditions. Mr. Poulton expressly states that "he felt convinced that the whole process was entirely involuntary;" and if that be so, would not the presence of unnatural *i.e.*, white, surroundings be a sufficiently disturbing element to produce the unnatural, *i.e.*, white, cocoons?

Is *Coremia unidentaria*, Haw., specifically distinct from *C. ferrugata*, Clerck.?

By RICHARD SOUTH, F.E.S. Read November 10th, 1892.

Probably the majority of entomologists are of opinion that *Coremia unidentaria* is not specifically identical with *Coremia ferrugata*. At the same time there are many who hold the opposite view, and regard the former insect simply as a well-defined form of the latter.

Newman, in his "British Moths," mentions a form of *unidentaria* with reddish central fascia; and it has been stated, but I do not know that the fact has hitherto been published, that *unidentaria* has been bred from ova deposited by an undoubted female *ferrugata*.

During the past twenty years I have frequently bred both *unidentaria* and *ferrugata*, but I have never seen a specimen among the offspring of a female *ferrugata* that could not at once be distinguished from *unidentaria*, or *vice versa*. In fact, I have always observed that specimens comprising the various broods of *unidentaria* and *ferrugata* were remarkably constant in retaining the colour and pattern of their respective parents. In evidence of this I exhibit portions of two broods of *ferrugata* and two of *unidentaria*, with the female parent at the head of her offspring in each case. The two series of *ferrugata* were selected for exhibition because they represent very opposite forms of the species. Not only do the specimens comprised in series A differ from those in series B in colour of the markings, but they also show considerable difference in the shape of the markings: thus we find in A that the internal edge of the central fascia is distinctly angled below the costa, and from that point runs in an inwardly oblique direction to the inner margin; whilst in B the internal edge of fascia is usually curved, but sometimes nearly straight. Other points of difference are also exhibited, but those referred to appear the most important.

Possibly the specimens in series B might be confounded with *unidentaria*, but if carefully compared with that species they will be found to differ therefrom in several important features. As it

may be useful to refer to the more prominent differential characters, they have been tabulated as follows :

1. The fore-wings are broader in proportion to their length in *unidentaria* than in *ferrugata*, and the outer margin is more rounded in the former.

2. The central fascia is always black in *unidentaria*, but, although sometimes very dark, is never black in *ferrugata*.

3. The band following the central fascia is ochreous-brown intersected by a wavy ferruginous brown line in *unidentaria* ; whilst in *ferrugata* this band is whitish or greyish, and is intersected by a blackish wavy line.

4. The outer edge of the band following central fascia is never well defined in *unidentaria*, but generally is so in *ferrugata*.

5. The outer marginal area of fore-wings is less ornamented in *unidentaria* than in *ferrugata*.

6. The outer marginal area of hind-wings is never so conspicuously bordered with darker in *unidentaria* as it is in *ferrugata*.

The above points of difference between the two species should amply suffice to separate *unidentaria* from *ferrugata*. It may, however, be mentioned that the "twin spots" situated just above the middle of the sub-marginal line are generally rather smaller in *unidentaria* than in *ferrugata* ; but no reliance can be placed on this character in itself. In a general way *unidentaria* is distinguished at once by the black fascia of fore-wings ; the only specimen of *ferrugata* that I have seen which could possibly be confounded with *unidentaria* is the one marked C in the box of mixed forms exhibited.

Returning to the two series of *ferrugata*, we find that two very distinct forms are represented, and we also find that the individuals in each series agree one with the other in colour and marking. To these facts we have to add a still more important one, and that is that the specimens in each series agree almost exactly in colour and ornamentation with their female parent. Now, from experiments with other species of moths, I have always found that where the male parent was known as well as the female, and the sexes were representatives of different forms of the species, the progeny would comprise specimens coloured like the male, as well as those of the female coloration. In these series of *ferrugata*, however, the specimens are uniform in each, and there is no evidence of any one individual of one series showing a tendency to vary in the direction of the specimens of the other series. This fact appears to me to be remarkable, and I can only suppose that in each of these cases the male parent must have been of the same form as the female parent.

Consideration of the facts adverted to, together with the knowledge that in the larval stage the species are very difficult to distinguish, leads me to the conclusion that although we are probably correct in keeping *unidentaria* specifically distinct from *ferrugata*,

we may not be equally correct in placing the two series A and B together as *ferrugata*.

I believe that there is still much to do before we can say that we know all about the common, but pretty little insect we call *Coremia ferrugata*; and I hope that these few observations may induce other collectors to work out, as far as possible, the life-history of such varieties of the species as they may meet with.

My Summer Holiday.

By R. ADKIN, F.E.S. Read December 8th, 1892.

It has been my custom, during the past few years, to give the members of this Society a short account of such matters entomological as came under my notice during my summer holiday; and in the hope that the few notes I was able to make within the fortnight or so that I was away from home, during the past summer, may not be altogether devoid of interest, I propose to occupy a few minutes in detailing them.

After considerable debate upon the respective merits of the various health resorts within an easy run of London, we finally decided upon Folkestone, and I accordingly took up my quarters there on the 4th of August. It was a beautifully sunny afternoon as the train sped along through the outskirts of greater London, bearing me to my destination, and I instinctively looked along the flowery railway banks. Butterflies were not numerous, an occasional *Pieris brassicae*, L., or one of its smaller brethren, for some time alone relieving the monotony; but just as we reached the first range of hills a brilliant specimen of *Colias edusa*, Fb., flitted by. It was the first that I had seen this year, and the very sight of it seemed to impress me with a longing to be rambling on the sunny downs, where, judging from the reports, I hoped that I should find the species in some abundance. In this I can hardly say that I was successful, for, as the following account will show, although always present, I was unable to discover it in any large numbers at any time during my stay. The 5th and 6th were fine, sunny days, and a morning walk about the downs and warren resulted in the discovery of a couple of specimens on each occasion. The 7th was rainy, and none were seen; but on the sun appearing again on the morning of the 8th, the species was seen flitting on the front of the Lees, to the number of possibly half-a-dozen. This appeared to be one of its chief resorts, and it was to be found there on every sunny day until I finally left on 5th September.

But to return to the downs, the species appeared to become gradually more common, reaching its climax about 21st August, on

which day about a dozen were captured, and as many more seen. By this time, too, they appeared to have spread over the country much more than in the earlier part of my stay; for whereas they then appeared to be confined to the down sides and sea front, they were now of common occurrence in the gardens in the town, and along the country lanes, and even on the beach. One point in its habits rather struck me; it is generally supposed, and according to my previous experience not without reason, that if one can only find a good clover field, when *edusa* is about, there is a certainty of plenty of specimens. Now it so happened that on the down sides where the species was most commonly met with, there was a very good clover field, and I spent a good deal of time in examining it; but, strange to say, found very few specimens indeed, probably not one among the clover, to six or eight on the other part of the downs. On the other hand, on a small patch of lucerne but a few yards square, growing right in the town, I saw four specimens at one time. The conclusion that I arrived at was that the sweet though scanty herbage of the downs had a greater attraction than the heavier growth of the clover when the two were growing close together; but that failing the former, the latter became an attraction of first rank. The variation in those that came under my notice did not appear to be so great as has been observed when the species has been common on some previous occasions, and as usual was confined chiefly to the females. These varied a good deal in the intensity of the black borders, and the number and size of the light spots contained in them, which in some specimens were very prominent, while in others they were almost obsolete. The var. *helice*, Hb., was met with occasionally, and some few specimens intermediate between it and the type were taken. The proportion of sexes were about equal, the females being perhaps slightly the more numerous.

It was not my fortune to meet with *Colias hyale*, L., during my rambles; it appeared to be somewhat later in appearing than *edusa*, not being seen until August 20th or thereabouts; and wet weather setting in during my absence in London, it was out and over before I had an opportunity of seeking it; but so far as I was able to learn, not more than a score of specimens were taken in the neighbourhood.

It will be remembered that in the early summer months not only *edusa*, but *Vanessa cardui*, L., and *Plusia gamma*, L., had been unusually abundant, the latter accompanied by some numbers of *Nomophila noctuella*, Schiff. These three species stand in a somewhat different category to *edusa*, being generally more or less numerous; whereas *edusa* appears to be not infrequently absent. I was therefore anxious to note the result that had followed what I have no hesitation in saying was a spring immigration on a large scale. My first ramble soon set the question at rest. Having ascended the downs by a most dusty road that made walking anything but a pleasure, I soon came beside a field of standing corn, situated between

the said road and the edge of the cliff, and surrounded by a low bank on which was growing a considerable quantity of thistles, knapweed, ragwort, etc., and not wishing to wander too far from home I made this my turning-point. Insects had been conspicuous by their absence during my uphill walk, but on turning into the corn-field the first thing that attracted my attention was a *gamma* flying out from among the stalks of the corn, hovering for a moment and then returning; others followed suit, and on a closer examination I found the field literally alive with them. They appeared to thread their way between the corn-stalks with the greatest ease, rarely rising above the ears or leaving their shelter. I had thus far not seen *cardui*; but on reaching the side of the field next the cliff edge, I soon came upon it in numbers. Glorious creatures, just fresh from pupæ, were sitting on the ground sunning themselves, or feeding on the flower-heads with which the bank was covered. Here, too, I first came upon *noctuella*, but only very sparingly; and it was not until a week or so later that I found it in any great abundance. Both it and *gamma* were very fitful in appearance, some days hardly any were seen, while on others, on exactly the same ground, dozens would dart out of almost every tuft of grass that one touched, weather seemed to have little to do with it, except that both species were more freely on the wing when it was warm and sunny than when the sky was overcast. *Cardui*, on the other hand, appeared to be always plentiful on the wing whenever the sun shone, and at other times was not uncommonly found at rest under the overhanging eaves of buildings, etc. It was not until the middle of August that *Vanessa atalanta*, L., was flying at all freely, and it appeared to increase in numbers into September; larvæ were quite common in patches of nettles throughout my stay, and at all times might be found in all stages, from those just hatched to fine full-fed fellows just ready to pupate. They also varied considerably in colour, and from those collected a long series was reared, but the imagoes were wonderfully uniform in pattern. *Vanessa urticae*, L., appeared to be fairly common in all stages, but I think not unusually so, and I failed to detect a single example of *Vanessa io*, L.

With regard to the other butterflies that came under my notice there is not a great deal to be said. *Pieris brassicae*, L., was very common; *Pieris rapæ*, L., less so: still a great many were seen; but *Pieris napi*, L., was exceedingly scarce. *Melanargia galatea*, L., appeared to be just coming out when I arrived, and freshly-emerged specimens were frequent on the grassy slopes well into the middle of the month. I have usually found this species on the wing from the middle to end of July, and should consider its appearance on this occasion fully a fortnight later than usual. *Pararge megæra*, L., was more common along the roadsides than elsewhere, occurring but sparingly on the downs. *Satyrus semele*, L., and *Epinephele ianira*, L., were fully up to their usual numbers; as were also *Cænonympha pamphilus*, L., and *Polyommatus phlæas*, L. Five

species of *Lycæna* were met with, *L. icarus*, Rott., *L. bellargus*, Rott., and *L. corydon*, Fb., all commonly, *L. astrarche*, Bgstr., somewhat less so, and *L. minima*, Fues., a single specimen on the 21st August. *Hesperia thaumas*, Hufn., and *H. sylvanus*, Esp., were frequently met with, but generally in a worn condition, and an example of *H. comma*, L., was taken near Cæsar's camp.

Zygæna filipendulæ, L., was very abundant during the whole of August, and even at the very end of the month perfectly fresh specimens were of by no means uncommon occurrence. I spent a good deal of time examining them for varieties, and in doing so was much struck by the large number of cripples that I came across. As a rule they were females, and from observations I was then able to make, I am inclined to think that the deformity was often caused by the too early attentions of the opposite sex. I several times found males paired with females whose wings were still limp; in one case the wings on one side of the female were fully developed, but on the other were much crumpled and filled with an excess of fluid; while in another they were distorted on both sides, apparently having been pressed out of position by the male before they were fully dry. I also noted that frequently the insects were feeding on knapweed flowers while paired. Such variation as I found was frequent, but not of a very striking character, and consisted chiefly in the confluence of one or other pair of spots; or, on the other hand, in the reduction of size of the spots,—in one case the sixth being reduced to a mere dot. *Zygæna trifolii*, Esp., was, of course, over before I reached Folkestone, but five specimens that were taken in the neighbourhood, and very kindly given to me by Mr. Austin, showed great variation in the width of the black margin of the hind-wings, it being unusually broad in two of them, and in one of these the spots on the fore-wings were large and partially confluent; while in the other they were small and separate. In the other three the black margin of the hind-wings was narrow, and the spots on the fore-wings confluent in two specimens; while in the third, those on the right side only were connected by a narrow red line, forked beyond the fifth spot.

I am also indebted to this gentleman for five specimens of *Dianthæcia carpophaga*, Bork., that were taken at *Silene* flowers earlier in the season; three of them have the ground colour of the wings almost white, and the markings in varying shades of grey, thus producing a very pretty, and, I believe, unusual form; while the other two are of the pale brownish type most frequently met with on the south coast.

One other species to which I paid some little attention was *Bryophila perla*, Fb. A considerable series taken on walls facing the sea, showed some amount of variation in the tone of colour, the extremes being an almost white ground with pale grey markings, and a somewhat buff ground with dark grey markings. A series taken on inland walls shows a similar range of variation; but as compared

with a series which I took at Eastbourne under precisely similar conditions, there appears to be less inclination to run into ochreous shades. The one yellow specimen shown was taken on an inland fence, but as at the time of capture this fence afforded the only shelter in the immediate neighbourhood from a small gale that was blowing, I think we may conclude that the moth had been driven from the exposed walls by the force of the wind, and had rested on the fence as the only place of safety. The remaining eight specimens are all from a concrete wall; seven of them are exceedingly dark, the usual pale ground colour of the fore-wings being replaced by a dull ochreous grey, and the hind-wings are suffused with a dark grey shade, showing the white sub-marginal spots in strong contrast, and giving the insect a very peculiar appearance. These seven are a fair average of the form taken on this particular wall, the eighth, which more closely approaches the type, being quite exceptional there.

Bryophila muralis, Forst., appears to be getting much scarcer in the district than it used to be, a constant search of the most likely walls revealing only some half-dozen examples; two of these, however, had but just emerged for their wings were only partially expanded, both being found about five o'clock in the afternoon.

The few other moths that came under my notice call for no special remark. The day-flying species that came in my way were of the most ordinary type, and I had but little opportunity for night work; indeed, on the only occasion when I attempted it, the approach of a heavy thunder-storm, accompanied by huge drops of rain, caused me to beat a hasty retreat ere the nocturnal species were on the wing.

Among larvæ the only thing that attracted my attention was the enormous number of *Bombyx rubi*, L., that were wandering about the downs, one could hardly help treading upon them; but I noticed that almost all of them had the conspicuous white eggs of an ichneumon securely attached to their skins; that any great number of imagines will result from the abundance of larvæ is therefore improbable.

COUNCIL'S REPORT, 1893.

THE Council of the South London Entomological and Natural History Society, in presenting the Twenty-First Annual Report to the members, are gratified in being able to state that the affairs of the Society remain in a prosperous condition.

During the past year the number of new members elected has not been very large, being only seven, and in the same period twenty-two resignations have been accepted; the Council also, in the exercise of their discretion, under Bye Law 10, sec. 2, have removed the names of ten members from the books for non-payment of their subscriptions, and the Society has suffered the loss of two members by death.

The operations of the aforementioned causes now leaves the total number of members at one hundred and ninety-two, and the Council trust that all will do their utmost in co-operating to maintain the numerical strength of the Society.

In the beginning of the year, a joint Committee of the Council and ordinary members, consisting of Messrs. AULD, BARKER, CARPENTER, EDWARDS, HAWES, TURNER, A. D. WARNE, WILLIAMS, and WINKLEY, was appointed to consider and deal with the Field Excursions for the ensuing Summer, and it was then arranged to hold the following:—

To *Horsley*, Surrey, on the 13th of May, under the direction of the Excursion Committee.

To *Oxshott*, Surrey, on the 10th of June, under the direction of Mr. R. SOUTH.

To *Westerham*, Kent, on the 15th of July, under the direction of Mr. H. J. TURNER.

A Fungus Foray in the Autumn, which Mr. STEP kindly consented to conduct.

These Outings were all held, with the exception of the last, which was abandoned, owing to the abnormally dry summer, and the consequent scarcity of specimens.

The Council desire to thank the respective gentlemen who conducted the above Field Excursions, but regret that such enjoyable trips do not meet with more general support from the members.

The Library, which remains under the care of Mr. H. J. TURNER, has received the following additions during the past year, and the thanks of all are due to the donors:—

“The Entomologist” for 1893, from Mr. R. SOUTH.

“The Zoologist” for 1893, from Mr. NEWMAN.

“The Entomologist’s Monthly Magazine” for 1893, from Mr. M’LACHLAN.

“The British Naturalist” for 1893, from Mr. J. E. ROBSON.

“The Entomologist’s Record and Journal of Variation” for 1893, from Mr. A. J. HODGES.

“The Essex Naturalist” for 1893, from the ESSEX FIELD CLUB.

The Special Index to the “Entomologist’s Record” for 1892, from Mr. TUTT.

“Report on Injurious Insects,” by Miss E. ORMEROD, for 1892, from Mr. R. ADKIN.

“The Transactions of the City of London Entomological Society” for 1891 and 1892, from the SOCIETY.

“Vegetable Wasps and Plant Worms,” by M. C. COOKE, from Mr. EDWARDS.

“List of Animals belonging to the Zoological Society,” from Mr. J. JENNER WEIR.

"British Lepidoptera," Vol. I., by C. G. Barrett, from the AUTHOR.

"Report of the Haslemere Natural History Society" for 1892, from the SOCIETY.

"The Natural History of the Tineina," Vol. I., by H. T. Stainton, from Mr. R. ADKIN.

"The Naturalist's Journal," from the EDITOR.

"Miscellanea Entomologica," from the EDITOR.

"Report of the West Kent Natural History Society," from the SOCIETY.

"Report of the Lancashire and Cheshire Natural History Society," from the SOCIETY.

"The Royal Natural History," Part I., by Lyddeker, from Mr. WARNE.

"Manuscript Catalogue of the Society's Library," compiled and presented by the LIBRARIAN.

The Society has also acquired, by purchase,

"Science Gossip" for 1893.

"Phytophagous Hymenoptera," Vol. IV., Ray Society.

"Larvæ of British Lepidoptera," Vol. V., Ray Society.

Mr. W. WEST (of Greenwich) still ably holds the post of Curator, and he reports as follows:—

"Contributions to the Cabinets have been made during the past year by Messrs. DENNIS, WALLER, GIBB, WEIR, and others; and though a vast number of promises have been received from various sources, all the insects have not yet arrived; but it is to be hoped that these promises will be fulfilled, in order that our reference collections may be made as complete and valuable as possible.

"A box of Canadian lepidoptera has been received from Mr. L. GIBB; and these, when added to the present speci-

mens from that country, will make a handsome addition to our Canadian collection."

The Council desire to thank the above-named gentlemen who have made additions to the Society's collections.

The Annual Dinner was held at the Bridge House Hotel on the 2nd of March, and it was, as usual, most successful.

The Abstract of Proceedings for the year 1890 and 1891, consisting of 193 pages of closely printed matter, was issued in the early part of the year; whilst those for 1892 and 1893 are in a forward state, and the Council hope to be able to publish them very shortly.

HERBERT WILLIAMS,

Hon. Sec.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

BALANCE SHEET FOR THE YEAR 1893.

GENERAL FUND.

| <i>Receipts.</i> | £ | s. | d. | <i>Expenditure.</i> | £ | s. | d. |
|---|------|-----|-----|--|------|----|------|
| To Balance in Hand | ... | ... | ... | By Rent (5 Quarters) and Attendance | ... | 33 | 15 0 |
| " Entrance Fees and Subscriptions Received... | 31 | 18 | 11 | " Printing | ... | 6 | 15 0 |
| " Sale of Dinner Tickets | ... | ... | ... | " Postage, Stationery, and Sundries | ... | 11 | 11 5 |
| " Receipts on a/c of Westerham Excursion | ... | ... | ... | " Insurance of Library and Cabinets (Fire) | ... | 0 | 8 3 |
| " " 1892 Exhibition (Part of) | 9 | 0 | 1 | " Society's Proportion of Guarantee 1892 Exhibition | ... | 1 | 5 0 |
| | | | | " Entrance Fees from October 22, 1891, carried to Suspense Account | ... | 2 | 12 6 |
| | | | | " Expenses of Dinner | ... | 8 | 0 0 |
| | | | | " " Westerham Excursion... | ... | 1 | 15 0 |
| | | | | " " 1892 Exhibition (Part of) | ... | 8 | 17 6 |
| | | | | " Balance | ... | 36 | 5 4 |
| | £111 | 5 | 0 | | £111 | 5 | 0 |

LIBRARY FUND.

| <i>Receipts.</i> | £ | s. | d. | <i>Expenditure.</i> | £ | s. | d. |
|---|-----|-----|-----|--|-----|----|------|
| To Balance in Hand | ... | ... | ... | By Subscription to "Science Gossip" and Back Numbers | ... | 0 | 6 8 |
| " Library Fines, 1892 | 4 | 0 | 9 | " Purchase of Back Numbers "Zoologist," etc. | ... | 0 | 2 8 |
| " Part Subscription to "Science Gossip" | ... | ... | ... | " Subscription to Ray Society, 1891 and 1892 | ... | 2 | 2 0 |
| " Returned | ... | ... | ... | " Binding Books | ... | 0 | 17 0 |
| " Library Fines, 1893 | 0 | 7 | 8 | " Balance | ... | 1 | 14 1 |
| | £5 | 2 | 5 | | £5 | 2 | 5 |

SUSPENSE ACCOUNT.

| | | | | | |
|------------------------------------|-------------|--|------------|--------|-------------|
| To Entrance Fees from General Fund | ... £2 12 6 | \| | By Balance | | ... £2 12 6 |
|------------------------------------|-------------|--|------------|--------|-------------|

PUBLICATION FUND.

| <i>Receipts.</i> | £ | s. | d. | <i>Expenditure.</i> | £ | s. | d. |
|------------------------------------|-----|-----|-----------------|---|-----|----|-----------------|
| To Balance in Hand | ... | ... | 22 12 3 | By Letterpress Printing and Binding, etc. | ... | 47 | 19 0 |
| " Donations | ... | ... | 22 17 6 | " Engraving and Printing Map | ... | 2 | 17 6 |
| " Sale of "Proceedings," 1887-1891 | ... | ... | 1 0 0 | | | | |
| Balance | ... | ... | 4 6 9 | | | | |
| | | | <u>£50 16 6</u> | | | | <u>£50 16 6</u> |

G

ASSETS AND LIABILITIES.

| <i>Assets.</i> | £ | s. | d. | <i>Liabilities.</i> | £ | s. | d. |
|---|-----|-----|------------------|---|-----|----|------------------|
| To Balance General Fund | ... | ... | 36 5 4 | By Balance Publication Fund | ... | 4 | 6 9 |
| " " Suspense Account | ... | ... | 2 12 6 | " Rent, Outstanding Accounts, etc., Nil | ... | | |
| " " Library Fund | ... | ... | 1 14 1 | " Balance | ... | 46 | 5 2 |
| " Arrears of Subscription, £20 7s. 6d.; | | | | | | | |
| Estimated Value | ... | ... | 10 0 0 | | | | |
| | | | <u>£50 11 11</u> | | | | <u>£50 11 11</u> |

Examined, compared with Books and Vouchers, and found correct, *January 18th, 1894.*

EDWARD STEP,
STANLEY EDWARDS, } *Auditors.*

PRESIDENTIAL ADDRESS, 1893.

GENTLEMEN,

There are few, if any, of the Sciences which combine in their pursuit more than Natural History, health-giving out-of-door exercise, and that severe study which is necessary to enable the student to solve the difficult problems presented. Whether the naturalist roams over lofty mountains, bleak moors, shady woods, or sheltered valleys, he is certain to find an abundance of objects of equal interest. Another advantage of the pursuit is that, in one form or another, it affords recreation and enlightenment from childhood to old age.

In the few observations that I shall make in illustration of these remarks, I propose to confine myself mainly to Entomology, because it is that branch of Natural Science to which the members of this Society chiefly devote their attention.

Man still retains that hunting instinct which in prehistoric times was a necessity, and at the present day is to many one of the most enjoyable of recreations; its gratification can in no way be measured by the value of the quarry; the coveted brush of the fox is of little intrinsic value; and much the same may be said of the head of a royal stag which has fallen to the rifle of the successful deerstalker, although in the latter case there is the venison also, the attainment of which at one time formed the only object of the chase, and now is barely thought of in its connection.

I have known the pursuit of Lepidoptera combined with that of the largest game; the late Mr. Buxton told me that on one occasion he saw a lion and a rare butterfly at the same time in South Africa, and he hesitated which he should try to obtain; he succeeded in killing the lion, and also captured the rare insect. Mr. Selous, too, that mighty hunter, also collects Lepidoptera.

In our own country the chase of many of our Rhopalocera is full of hopes and fears, and those who have captured *Apatura iris*, well know with what a thrilling sensation of

intense pleasure it was removed from the net to the pocket-box; indeed, a relation of mine when he first caught that magnificent species was so overcome by excitement that he was obliged to pause for some time before he could secure his prize.

Dr. A. R. Wallace, giving his experience of his first capture of that splendid species *Ornithoptera cræsus*, says, "On taking it out of my net, and opening the glorious wings, my heart began to beat violently, the blood rushed to my head, and I felt more like fainting than I have done when in the apprehension of immediate death." I believe most of us would have a feeling akin to this upon the capture of a much-coveted species or variety.

I claim, therefore, for our science, that its pursuit in the field is attended by the most pleasurable excitement; that it gratifies in a peculiarly unobjectionable manner the innate love of hunting; and to all, particularly those whose avocations are of a sedentary character, it affords a change of occupation, conducive in the highest degree to health and longevity, as the obituaries of the Linnæan, Entomological, and other Natural History Societies amply testify.

In youth, therefore, I am of opinion that the entomologist should be more of a field than a closet naturalist; not neglecting the literature of the science, particularly during the winter months; he will thus lay up a rich store of knowledge, and his collections will afford him, especially those parts made personally, the best materials for the more scientific work of riper age.

The members of this Society are eminently distinguished by having attained to the highest excellence in rearing Lepidoptera through their earlier stages, often from the egg. This is a most important branch of entomology, because it is only through the ontogeny of a species that a correct knowledge of its phylogeny can be obtained, and as a result its proper classificatory position determined.

To give an example; I believe it is generally admitted that the imagines of *Acronycta psi* and *A. tridens* cannot be separated, yet the adult larvæ of the two species widely differ; although, as shown by Dr. Chapman, *vide* "Entomologist's Record" for 1892, plate vi, the distinction between the very young larvæ can be recognized, almost only, by the different alternation of the dark and light-coloured segments of their bodies. These moths, therefore, present us with the singular fact, that two species are barely differentiated in their earliest larval state, inseparable as perfect moths, and widely different

in their last larval stage, the latter admirably shown in Buckler's "Larvæ of British Butterflies and Moths," vol. iv, pl. lvi.

There is an aspect of larva rearing in which the adepts of this Society may render most important aid to science, by carrying further those investigations so ably initiated by Dr. T. A. Chapman, dealing with the pupal condition of the Lepidoptera-Heterocera. That accomplished entomologist in an epoch-making paper read before the Entomological Society, February 22nd, 1893 (*vide Trans. Ent. Soc.* 1893, pp. 97-119), has shown that the Lepidoptera-Heterocera fall naturally into two quite distinct divisions, viz., (a) Obtectæ, which have the "Pupa smooth and rounded, externally solid, inner dissepiments flimsy. Free segments in both sexes 5 and 6 (abdominal). Never emerges from cocoon or progresses in any way. Dehiscence by irregular fracture." (b) Incompletæ, "pupa less solid, and rounded, appendages often partially free. Free segments may extend upwards to 3rd (abdominal), 7th always free in male, fixed in female. Dehiscence, accompanied by freeing of segments and appendages previously fixed (except in Pterophorinæ), pupa progresses, and emerges from the cocoon."

Here is a fundamental difference of a structural character existing between the two divisions, clearly set forth; the pupæ of the Incompletæ are more or less capable of progression; in some species, indeed, their movements are so lively, *e.g.*, *Macrogaster castaneæ (arundinis)*, that care has to be taken, when cutting the reed inhabited by a pupa, that it does not escape by rapidly wriggling out at the open end; on the other hand, those numerous species of the Obtectæ which pupate under ground, at the time of the emergence of the imago remain immovable; and the forcing its way out through the soil is performed by the perfect insect, although it would seem that the hard chitinous pupa was better adapted for such work than the soft imago.

Time will not permit me to enter into a full discussion of the subdivisions which the learned Doctor tentatively suggests, should be made in each division; but there are several dislocations of the classification hitherto in use which more particularly call for remark.

The Sphingidæ are relieved from their very erroneous association with the Sesiidæ, so called erroneously, and Zygænidæ, with which they have so very little in common; the two latter families are veritable Incompletæ, and the former are typical Obtectæ.

The Hepialidæ, *Cossus*, *Zeuzera*, *Macrogaster*, and the Cochliopodidæ, are relegated to the Incompletæ, with which their pupal structure correctly associates them; the first family and the three genera mentioned contain very large moths, some of the Hepialidæ being at least six inches in expanse of the upper wings. It follows, therefore, that the use of such words as Macro- and Micro-Lepidoptera are no longer applicable to the two divisions, and should be discontinued; a view which has been long held by the best systematic Lepidopterists.

The proper position of the Psychidæ has long been a disputed point. This is settled in Dr. Chapman's classification; the form of the pupa and the ease with which the male protrudes the pupa, prior to emergence, some 15 mm. beyond the constructed case, places the family undoubtedly amongst the Incompletæ, and it is associated by him in a subdivision with the Tineidæ and Sesiidæ.

I have preserved several specimens of the pupa and feeding cases of *Psyche villosella*, and I find that the pupa is very incomplete, the wings and legs of the male have quite separate, almost separable encasements; and on the emergence of the imago the chitinous covering of the pupa remains attached to the feeding case by the aid of the last abdominal segment. The female, on the other hand, remains concealed in the case in which she deposits her eggs; sometimes I have seen a portion of her apod apterous body projecting, apparently a movement required to open the end of the case for the entry of the male; but in this event there was no portion of the pupa covering exposed, so that she may be said to have in this respect the habit of the Obtectæ; the departure in her case from the general rule amongst the Incompletæ being a necessity for her mode of ovipositing.

Among the most important changes of position in what have usually been termed Micro-Lepidoptera, is that of associating the Gelechidæ, Plutellidæ, and Cœcophoridæ with the Pyraloids, and suggesting that the Hyponomeutidæ, Argyresthiidæ, and Coleophoridæ may form another division of equal systematic value.

I earnestly recommend every member of the Society to carefully read Dr. Chapman's paper, and endeavour to the best of his ability to assist him in the important work of a more scientific and systematic revision of the classification of the Lepidoptera-Heterocera. Descriptions, or better still, drawings or photographs of the egg, larva in all its stages, and pupa are what are needed, and I know of no body of

Entomologists better able to supply that need than those I have the honour to address.

One word of warning I venture to make to those whose studies do not embrace any of the foreign Lepidoptera-Heterocera; our limited insular fauna does not admit of forming from it alone much generalization; there are important families of the division under consideration which have no representatives in these islands; of others, there are very few indigenous species; the Zygænidæ, for instance, are divided into at least nine sub-families, only two of which, the Anthrocerinæ and Adscitinæ, represented each by a single genus, occur in the British Isles, viz., *Anthrocera* and *Adscita* (*Procris*).

One generalization I venture to make. It appears that each of the great divisions of the Lepidoptera-Heterocera contains within its limits both very large and very small species, and that the evolution from the lowest to the highest forms has proceeded in each *pari passu*.

It is a very singular fact that so many of the families stand quite alone, having almost no apparent connection with any other, so that the order in which they should be placed in relation to each other is not apparent; to take the Zygænidæ again as an illustration, whether placed amongst the so-called Sphinges, or, as Dr. Chapman places them, next the Cochliopodidæ among the Incompletæ, they appear to have no affinity with their assumed neighbours.

The late Professor Westwood, when placing the Zygænidæ next the Sphingidæ remarked, "We have here a family of insects possessing characters as completely at variance with those of the preceding as are to be met with amongst any of the remaining groups of the Lepidoptera." It is clear from this that the Professor was fully alive to the untenable position in which they had been absurdly placed.

The very small number of genera of the Zygænidæ found in these Islands, and the very remote affinity they have with any other family represented in our fauna, causes their isolation to appear greater than is the case when the comparison is made with some of the purely exotic families.

To give a further illustration of how little we can generalize from a survey of British Lepidoptera-Heterocera only, let me draw your attention to the Limacodidæ (Cochliopodidæ), of this large family. We have in this country but two species, viz., *Apoda anellana*, Linn. (*testudo*, Fabr.), and *Heterogenea cruciata*, Knoch. (*asella*, Fabr.); but it contains considerably more than a hundred genera. Whether the genera so as-

sociated are all Incompletæ is a problem to be worked out ; there is little in the appearance of the imagines of our species to suggest the profound difference which exists between them and the Bombycidæ, but the larvæ and pupæ show how widely apart these two families should be placed. The legs of the larvæ in the Limacodidæ are evanescent, and, on the other hand, they are perfectly developed in the Zygænidæ, showing how very little affinity some of the families of Incompletæ have among themselves.

The very name of the sub-order Lepidoptera-Heterocera is suggestive of the heterogeneous character of the insects included therein. It is a step in the right direction to divide it into Obtectæ and Incompletæ, making with the Rhopalocera three sub-orders ; for many years past it has appeared to me that the oral organs of the imagines have been far too little considered in classification.

All field naturalists will bear me out in the statement, that there are many large families in which the structure of the parts of the mouth in the imagines is such that they are unable to feed ; for instance, the Noctuidæ, the spiral tongue or maxillæ of which is greatly elongated, often swarm at sugar baits, and on flowering trees and shrubs, such as the lime, willow, ivy, and others ; but the Geometridæ, in which the maxillæ are short and weak, being nearly membraneous, are very rarely if ever so attracted, neither do they visit flowers. The same may be said of the Bombycidæ, the maxillæ of which, when present, are so short and weak as to be useless as a tongue ; yet the latter family is placed by systematists next to the Sphingidæ, which have the most highly developed suctorial mouth, the tongue being often longer than the body, and sometimes in certain exotic species it is several inches in length.

In my judgment, when these deeply-seated differences of the imagines in structure and habits are considered, together with those pointed out by Dr. Chapman in the pupæ, it is a very unnatural combination to associate under the objectionable name of Sphinges and Bombyces, among others, such widely different families, as the Sphingidæ, Bombycidæ, Zeuseridæ, and Hepialidæ. The subject of classification is one that time will not permit me to pursue further, and I shall therefore add no more on that point.

It is a well-known fact to those who have entomologized in the higher Alps that an unusual proportion of melanic and phæic varieties of Rhopalocera are found, and the question arises as to the cause of such aberrations. In these altitudes

it is no uncommon occurrence, to have a spell of cold weather, accompanied by snow, even during the summer months. These conditions are precisely those which Mr. Merrifield has imitated by exposing the chrysalids of butterflies to cold for a few days prior to the emergence of the imagines, and the result has in many cases been similar, notably in *Vanessa polychloros*.

Melanism is a very large subject, and one on which the materials for generalization are quite inadequate. It is common both to vertebrates and invertebrates; and the cause which has produced a black *Argynnis*, or *Apatura*, is doubtless very different from that which produces blackness in a horse, ox, dog, or cat.

Melanism seems the very opposite of albinism; and yet in both phenomena there is an absence of colour, and in some respects they seem allied. I have known a pure black fowl in one moult to change to pure white; and one instance came under my notice of a white peafowl chick moulting into an unusually dark peacock of the variety *nigripennis*. I have also known black ducks become almost white.

It is singular that albinism should be so rare amongst Lepidoptera. I have never taken but one albino moth, viz., *Eubolia bipunctaria*: pallid or xanthic forms are by no means uncommon.

Referring again to Mr. Merrifield's experiments, the most interesting fact substantiated is the alteration of the pattern of the markings of the imagines of the second emergence by the application of cold to the pupæ.

In the case of *Selenia illustraria* the moth of the spring is not only very much darker than that of the summer emergence, but the bars of the wings are of a different shape. In the former, the exterior bar is more diagonal and somewhat waved; in the latter, the same bar is not placed in so diagonal a position on the upper wings; and it is also distinctly angulated at about one third of the breadth of the wing from the costal margin.

Mr. Merrifield has shown that by the application of cold to the pupæ, the imagines of the summer emergence are produced *both in colour and markings* alike to those of the normal spring emergence. Such an immediate response to an alteration of temperature is one that could not have been foretold, had not those valuable experiments been made.

Dr. Weismann's theory which he applied to the horæomorphic butterfly *Pieris napi*, seems to be borne out by Mr. Merrifield's experiments on the moth, that it is descended from a mono-

goneutic species, and that its digoneutism has been acquired, as the climate of the palæarctic region became more genial after the glacial period. It appears to me, therefore, that the effect of the cold on the pupa has prevented the insect from attaining to its highest imaginal development both in the colour and pattern of the wings.

It should I think be borne in mind that larvæ in the spring and summer months have the advantage of feeding on developing and fresh leaves; but, on the contrary, in the autumn their food becomes daily less succulent and probably more innutritious. It, therefore, might be expected from *a priori* considerations that those larvæ of a digoneutic species which fed on the richest food would develop into the finest and most brilliantly coloured imagines.

I anticipated that there would this year have been an increase in the size of the butterflies, as a result of the remarkably long hot summer, as the season progressed, such being the case in Japan, where a longer and warmer summer than ours obtains. Mr. Pryer, in his work "*Rhopalocera Nihonica*," writes thus of *Papilio machaon*: "The first imago appears in March, from larvæ which have fed up late in the preceding autumn. These March specimens are invariably small and light coloured, and are the *machaon* form; as the summer advances the successive broods increase in size and depth of coloration, until August, when the *hippocrates* form appears." In the illustrations given in the work of the two emergences, the spring measures 80 mm., and the August 130 mm., in expanse of wings.

But my expectations have in no way been realized, the broods of the digoneutic and polygoneutic butterflies have shown no marked increase in size; *Heodes phlæas* and *Pieris rapæ*, which have produced several broods, have remained of the normal size; and monogoneutic species have in this respect been unaffected; indeed, with regard to *Argynnis paphia* and the dimorphic female *valesina*, a very dwarf race has been common in the New Forest, flying at the same time as those of the normal size. In some species both of butterflies and moths the imagines of the second emergence have been smaller than usual.

The study of variation in British Lepidoptera has given new life to the collection of indigenous species of that order, and many singular facts have been brought to light; extreme aberrations, such as it seemed improbable would occur again, have been found in districts most remote from these Islands.

I have on a previous occasion brought before the Society

an aberration of *Pyrameis cardui*, from Graham's Town, South Africa, identical in its bizarre pattern with one taken in this country, and figured by Newman in his "British Butterflies," p. 64; and recently in a fine collection of moths from the Amur district, in the possession of Mr. P. Crowley, I saw a specimen of *Spilarctia lutea*, Hufn., var. *zattima*, Stoll (*lubricipeda*, Auct.).

In the first instance, the same aberration occurred 51° north and about 30° south of the equator; the second was found here in England nearly in the longitude of Greenwich, and also in Asia beyond 130° east longitude. Stoll, who first described the variety *Pap. Ex.* iv, p. 182, t. 381 F, writes that it had been taken at Surinam, and in the Barronie de Breda. I am inclined to think that the South American habitat given arose in some mistake, it is scarcely likely to be found in the tropics.

The student of the Lepidoptera-Rhopalocera has had great cause to thank Mr. W. F. Kirby for the assistance given him by the publication in 1871 of his *Synonymic Catalogue of the Diurnal Lepidoptera*, followed by a supplement in 1877. This index of indices has aided the study of that sub-order incalculably: one fails to realize how the student could have worked without its help. It is, therefore, with the greatest satisfaction that the first volume of a like catalogue of the Lepidoptera-Heterocera, which has been published, has been welcomed.

Few persons have any idea of the amount of labour, or rather drudgery the production of such a work entails. A friend of mine, who, dealing with a different subject, prepared a catalogue, told me that a single line had sometimes taken a week's work to prepare. Mr. Kirby states that he has had the catalogue, of which the first volume is now published, twenty years in hand.

It becomes a duty for all those who can afford the expense to purchase Mr. Kirby's invaluable book; the more so as the publication of the four volumes necessary to complete the work depends in part on the support he receives from entomologists. The perusal of such a list of species expands one's ideas; and the necessity for more genera, than a small indigenous fauna would suggest, becomes apparent. Take, for instance, Stephens' genus *Spilosoma*. This is left with twenty species, after fifty-four have been separated by Mr. Butler, and placed in the genus *Spilarctia*. Of course, Mr. Kirby in his work restores the two genera of Stephens' *Diaphora* for *D. mendica* and *Phragmatobia* for *P. fuliginosa*. These, by a retrograde

step have been placed in *Spilosoma*, in which genus Stephens never intended to include them. The latter species, indeed, is not one of the *Spilosominæ*, but of the *Arctiinæ*.

A most valuable "Catalogue of the Lepidopterous 'Super-family' Noctuidæ, found in Boreal America," by John B. Smith, Sc.D., has been issued as a bulletin of the United States National Museum. With the help of this and Staudinger's well-known "Catalog der Lepidopteren des Europæischen Faunengebiets," the student becomes for the first time well provided with an index of the species of Noctuidæ found both in Europe and the northern part of America.

I have had the work in my possession but a few days, and have therefore not been able to fully examine into its merits; but feel sure that the high reputation in which Dr. Smith is already held, will by it be sustained, and probably enhanced.

I feel it is ungracious to offer a word of criticism on so excellent a work; but I must protest against the new coined word "Super-family." It is quite unnecessary if the termination of *-idæ* is used for the higher divisions or families, and *-inæ* for the next lower divisions or sub-families, as was done by Swainson, and other eminent naturalists, at least 60 years ago, and in the present day is adopted by most entomologists, including Dr. Smith's two accomplished countrymen, Messrs. Edwards and Scudder.

There seems to me to be no sense of proportion in dividing the Noctuidæ of Dr. Smith into three families as he has done, using for their names the same termination *-idæ*. His Thyatiridæ consists of five small genera with but fourteen species; Brephidæ with but two genera and only five species; and Noctuidæ with more than 200 genera, and thousands of species, of the most heterogeneous character, such as *Demas*, *Acronycta*, *Catocala*, *Hypena*, and *Euclidia*, which appear to be as remote in their affinities with each other as they are from the Thyatiridæ; the Brephidæ may, as Mr. Meyrick thinks, be Geometridæ.

It is not intended to be maintained that the number of species in a family, whether small or great, decides its relative classificatory value; but that, if the Thyatiridæ are separated from the Noctuidæ as above, the two divisions are not of equal rank.

The rapid growth of Entomological literature renders such Index Catalogues, as those adverted to, of inestimable value. Would that there were indices for such serial publications as the "Zoologist," "Entomologist," and "Entomologist's

Monthly Magazine," embracing their contents for ten or twenty years in one volume; without such aid the wealth of information they contain is almost unavailable.

Hybridization amongst Lepidoptera is a very interesting subject; the fact that closely allied species are often found in each other's company, without the production of hybrids, is itself a proof that a physiological bar exists between them.

In Nature I have observed and taken hybrids between *Anthrocera filipendulæ* and *A. trifolii*. These are gregarious species, and it is in certain localities only that flocks of the two are found in company. My experience of more than 50 years collecting on the South Downs is that *A. filipendulæ* only occurs on those chalk hills; but in the Weald of Sussex, the two species are often found together, and from the experiments made by Mr. Fletcher it appears that hybrids are easily obtained between them in confinement: this is, however, a very exceptional case.

I have a specimen of *Lycæna bellargus* ♂ which I took coupled with *L. icarus* ♀, and have one doubtful hybrid between the two species; and also one equally uncertain between *Melanippe rivata* and *M. montanata*. Beyond these I have myself taken no other hybrids in Nature.

Experiments should be made in hybridization between perfectly well-defined species which are geographically separated in their distribution, and between which hybridization in Nature could never have taken place. A physiological bar of infertility between them need not exist; and, judging from what we know of in plants, is in numberless instances not found.

Entomologists should be guided in these matters by the experience of horticulturists. Plants of species abundantly distinct, inhabiting different hemispheres, are often easily crossed, and the offspring is commonly perfectly fertile. Recently a *Begonia* from Socotra has been crossed with a totally different species from South America.

I have already made this address too long, but I venture to say a few words on the value of a well-arranged private collection, which I consider absolutely necessary for the student. It is in one's own study only, that a minute and deliberate examination of specimens can be satisfactorily made; in public museums, of course, it is rarely and for very special reasons only, that the glass of the drawers is permitted to be removed, and then with a curator present. The examination, therefore, is hurried and of an imperfect character.

A collection made by oneself it has been well said becomes "a record of your wanderings, your visits, your friendships, a perpetual reminiscence" of a life full of enjoyment; and in old age, when one can no longer pursue the swift-flying Apaturids and Vanessids, one can recall by the inspection of one's cabinet the intense delight their pursuit has afforded.

The Society has now attained to its majority; this is its 21st Anniversary Meeting. It probably was never in a more prosperous condition, and the perfect unity of purpose existing in it is shown by the fact that the whole of the candidates recommended by the outgoing Council for election as Officers and Council for the ensuing year, have been elected without any opposition.

I now relinquish to my worthy successor, Mr. Step, the office of President; and in doing so have to thank the Officers and Council of the Society for the kind assistance invariably afforded to me, and the members generally for their attendance at the meetings, for their valuable and interesting exhibitions, and remarks thereon, and for their loyal support to me in the chair.

Many amongst you, I doubt not, are looking forward to the delights of field natural history at the first appearance of spring, and ardently expecting the time when you will be able to say, "The flowers appear on the earth, the time of the singing birds is come, and the voice of the turtle is heard in our land." May the coming season be to you all one of joy and gladness.

J. JENNER WEIR.

ABSTRACT OF PROCEEDINGS.

JANUARY 12th, 1893.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

Mr. Tugwell exhibited an ochreous var. of *Agrotis agathina*, Dup. ; a whitish drab *Tæniocampa stabilis*, View. ; very varied forms of *T. gothica*, L., with var. *gothicina*, H.-S. ; very small and well-marked *Noctua festiva*, Hb., var. *conflua*, Tr. ; large *Melanippe fluctuata*, L. ; well-marked *Boarmia repandata*, L. ; and specimens of *Dianthæcia barrettii*, Dbl.

Mr. Frohawk exhibited a series of *Colias edusa*, Fb., showing in the males considerable divergence from the normal type.

Mr. Dobson showed *Eugonia tiliaria*, Bork. (*alniaria*, L.), bred from a light female, especially to show the range of variation in one brood.

Mr. Robson exhibited specimens of *Macroglossa stellatarum*, L., reared from larvæ obtained in Hampshire.

Mr. Cant showed on behalf of Mr. South preparations of the male genitalia of various forms of *Boarmia repandata*.

Mr. R. Adkin exhibited examples of *Biston hirtaria*, Clerck., and made some observations thereon (cf. *Entom.*, xxv., p. 129).

Mr. Kenward exhibited pale straw-coloured varieties of *Polyommatus phlæas*, L., taken in Kent during the year.

JANUARY 26th, 1893.

ANNUAL GENERAL MEETING.

C. G. BARRETT, Esq., F.E.S., *President*, in the Chair.

The evening was devoted to receiving the reports of the Council and Officers for the past year, the election of Officers and Council for the ensuing year, the reading of the retiring President's address, and the consideration, at a special meeting, of a proposal to change the time of meeting.

The following is a list of the Officers and Council for 1893:—

President.—Mr. J. Jenner Weir, F.L.S., F.Z.S., F.E.S.

Vice-Presidents.—Mr. C. G. Barrett, F.E.S., and Mr. C. Fenn, F.E.S.

Hon. Treasurer.—Mr. R. Adkin, F.E.S.

Hon. Librarian.—Mr. H. J. Turner, F.E.S.

Hon. Curator.—Mr. W. West (Greenwich).

Hon. Secretaries.—Mr. F. W. Hawes, and Mr. H. Williams.

Council.—Messrs. H. W. Barker, F.E.S., F. W. Frohawk, F.E.S., J. Henderson, R. South, F.E.S., E. Step, W. H. Tugwell, Ph.C., and J. W. Tutt, F.E.S.

At the special meeting it was decided that no alteration of the time of meeting should be made.

FEBRUARY 9th, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Mr. R. L. Sillar was elected a member.

Mr. F. W. Frohawk exhibited living larvæ of *Epinephele ianira*, L., some of which had completed their third, and others their fourth, changes of skin. The ova were laid at the end of July, 1892, and commenced hatching about the 15th of August. He remarked that these larvæ fed, on and off, throughout the winter months, seldom remaining for more than ten or twelve days at a time without food, and noticed that they rested head downwards at the roots of the grasses on which they fed. Mr. J. J. Weir said that the larvæ of species hibernating in that state appeared regularly, no matter how cold the nights were; and Mr. F. W. Hawes stated that he had collected larvæ of *E. ianira* at dusk, and they were invariably feeding with the head in an upward direction.

Mr. R. Adkin exhibited a series of *Aplecta prasina*, Fab. (*herbida*, Hb.), bred during November and December, 1892; the ova were obtained from a moth taken at Polegate during the summer of that year.

Mr. R. Waller exhibited a fine series of *Smerinthus tilia*, L., bred in the south of London; and Mr. J. J. Weir drew attention to one example which had a decided tendency to melanism, and said it would be interesting to note if this species would in the course of time become melanic in the London district.

Mr. H. McArthur exhibited a specimen of *Tæniocampa gothica*, L., var. *gothicina*, H.-S., and asked if he was correct in his determination. Mr. C. G. Barrett replied that the specimen was undoubtedly the true var. *gothicina*. Mr. McArthur also exhibited specimens of *Coccyx cosmophorana*, Tr., and *Retinia duplana*, Hb., from Forres, N.B., and suggested that the latter insect was imported with the Scotch fir from Norway; but Mr. Barrett remarked that the Scotch fir was indigenous, and that all the original specimens of so-called *R. duplana* were small specimens of *R. turionana*, Hb. Mr. J. W. Tutt remarked that *R. turionana* was only taken every alternate year, and Mr. McArthur suggested that the species required two years to pass through its various stages.

Mr. J. M. Adye exhibited a fine and variable series of *Boarmia repandata*, L., including some banded forms (var. *conversaria*, Hb.). The specimens were taken at sugar in the New Forest during July, 1892.

Mr. J. Jenner Weir drew the attention of the Society to an illustration in *Insect Life* for January, 1893, p. 206, reduced from a photograph, of *Anosia plexippus*, L., showing about two dozen of the insect closely packed together on the small branch of a tree, and read the following notes:—"It appeared that last September millions of these beautiful butterflies had been seen at Oklahoma, journeying from north to south, resting at night in immense swarms, as shown in the photograph, which had been taken with the aid of the electric light. All the evidence obtained proved almost to a certainty that this insect was migratory, precisely in the same manner as many species of birds; the subject had been admirably dealt with by Mr. Scudder in his valuable work, *The Butterflies of the Eastern United States and Canada*, in which he records several instances of enormous autumnal flights of the butterfly from north to south, and also several flights from south to north. The object he had in view in bringing the interesting habits of this wandering butterfly before the Society was not only because of late years it had become an occasional visitor to the southern parts of this country, but also to compare its migratory habits with those of *Colias edusa*, Fb. It was quite clear that the latter species migrated in certain years to England from the Continent in considerable numbers, that these visitors were hibernated imagines from more southern latitudes, that one or two broods were produced here during the year; but there was no proof that the perfect insect ever hibernated in this country, nor that there was an autumnal migration to the Continent on the approach of cold weather;

further, it does not seem to be ascertained how far north it has been proved to hibernate as an imago. It appeared to him that the migratory instinct of *Colias edusa*, L., was not perfected—there was only the tendency in certain years to migrate unusually far north; but there existed no evidence, so far as England was concerned, that these Vernal immigrants produced Autumnal emigrants. The movement of this butterfly more resembled that of the lemming (*Myodes lemmus*), which occasionally swarmed down from the upland districts of Norway, moving always westwards, and drowning itself in the German Ocean. Even in the case of *Anosia plexippus*, Mr. Scudder seemed to think that many specimens endeavoured to hibernate in the imago state too far north, and, to use his own words, ‘possibly sometimes throughout the entire district of New England every single specimen that remains with us perishes.’ Therefore, the hope once entertained that this fine butterfly might establish itself in this country becomes very faint. It is possible that it may establish itself in Southern Europe, and, following its hereditary instinct, become a regular summer visitor to these islands.”

Mr. C. G. Barrett remarked that although some dozen or more specimens of *A. plexippus* had been taken in this country, chiefly in the south and south-west, there were only three records for the continent of Europe; and concluded that as the specimens taken in this country were all of the North American form, that they had come at a stretch 3,000 miles in the higher latitudes well out of storm reach, and that as a consequence the more southern portions of the European continent were not within the line of emigration. Mr. J. Jenner Weir noted that one specimen had been recorded from Gibraltar. He stated that Mr. Scudder had given it as his opinion that *A. plexippus* migrated by commercial agency, and that being abundant in New Jersey, U.S.A., the species came eastward for hibernating purposes. One specimen had been seen at Moose Factory, Hudson’s Bay, showing the extended range of the species in North America. Mr. F. W. Hawes said that the specimen of *A. plexippus* in his possession was probably the most easterly taken in England (recorded in the *Entomologist*, vol. xix., pp. 12, 13), and was in good condition so far as its rough capture had allowed.

Mr. Mansbridge, who had earlier in the evening exhibited specimens in illustration, read a paper entitled “Notes on Melanism in Yorkshire Lepidoptera,” of which the following is a summary:—

During a two years' stay in the West Riding of Yorkshire Mr. Mansbridge gave his particular attention to certain well-known and common species of lepidoptera, which are famous for the melanic races they produce in that district. His observations were principally carried on in the neighbourhood of Leeds, but he occasionally visited noted collecting grounds in the county. Referring to the area between Leeds and Bradford, in which Horsford, the manufacturing village where he resided, is situated, he stated that it is crowded with iron works, forges, and mills; whilst an almost unbroken string of townships connect the two large centres referred to. In consequence of this vast assemblage of smoke-producing agencies, the atmosphere is heavily charged with murky vapour, which in the neighbourhood of the forges is so dense as to give one the impression of black fog. Much of this smoke, he said, "is deposited directly on the trees in the form of soot, and a great portion of the remainder is washed down by rain; thus giving rough surfaces, as tree boles and stone walls, a permanent black coating, and the foliage is so besmirched that autumnal tints in their full beauty are unknown. In addition to the effect of the smoke, surfaces are also rendered dark by the rain, which in spring is almost constant: the rainfall for the district being about 36 inches."

Mr. Mansbridge then proceeded to discuss the variation of the species. Among the butterflies, he said, there was no striking tendency to melanism; females of *Pieris napi* were darker, and, where represented, some of the Satyridæ, such as *Epinephele ianira* and *E. hyperanthus*, were duller than the same species in the south; whilst, on the other hand, *Erebia ethiops* was brighter than Scotch examples. The Heterocera were considered at great length. Of the three species of Sphingidæ met with—*Smerinthus populi*, *Ino statice*, and *Zygæna lonicera*—none were darker than southern specimens, and, except in the cases of *Arctia lubricipeda* and *A. menthastri*, both of which had larger and more numerous spots, the Bombyces observed were similar to examples from the south. Among the Noctuæ and Geometræ, a number of species exhibiting a greater or lesser tendency to melanism, were referred to. In his concluding remarks Mr. Mansbridge said that the extraordinary amount of smoke created in the district led to a permanent darkening of the trees, etc., and that this darkening was to some extent increased by the high rainfall. Probably there was no other district in England where the same conditions obtained to the same degree as in the West Riding of Yorkshire, and it was a fact that as one

went out from Leeds in any direction where there was less smoke the percentage of melanic varieties became less, and that the further one went from that smoky area the lower the proportion of the varieties became. These remarks did not, however, apply in all instances, as for example in the case of *Tephrosia biundularia* or *Cleoceris viminalis*; but it was worthy of notice that even in these species the melanic specimens occurring in the West Riding were usually darker than those from smokeless districts. Without desiring to give undue emphasis to the statement, he was, from actual study of the environment and climate on the spot, forced to the conclusion that smoke is the chief factor in the production of melanism among lepidoptera in the West Riding of Yorkshire.

After remarks by various members on some of the questions raised by Mr. Mansbridge in the course of his observations, chiefly the tendency to melanism displayed by many species, e.g., *Phigalia pedaria* (*pilosaria*), and *Diurnea fagella*, noticed by Messrs. Barrett and Adkin; Mr. J. W. Tutt proposed a vote of thanks to Mr. Mansbridge for his paper, and for the excellent array of facts which he had brought together. In the course of his remarks Mr. Tutt drew attention to the fact that although many species, especially among the Noctuæ, were rightly considered darker in some of the northern districts of England, yet several, e.g., *Triphæna pronuba* at Deal, *Hybernia aurantiaria* from Epping Forest, were equally variable and with a decided tendency towards melanism. Mr. C. G. Barrett seconded the vote of thanks, which was unanimously carried. He mentioned that *Polia chi* var. *olivacea* was taken in the Sheffield district, and he believed also in Derbyshire. Mr. Mansbridge replied, and incidentally mentioned that examples of East Riding species were lighter than those from the West Riding of Yorkshire.

FEBRUARY 23rd, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Mr. S. Edwards exhibited several species of Exotic Rhopalocera, and called special attention to *Papilio zagreus*, from Bogota, which mimics a species of *Acraea*, and *P. govindra*, from the Himalayas, which mimics a species of the Danaïs group of butterflies.

Mr. H. A. Auld exhibited a box containing a small collection of Coleoptera from the Cape of Good Hope.

Mr. C. G. Barrett invited the attention of the members to samples of a process of transfer applied to lepidoptera, whereby the wings of an insect, in this case of *Pararge egeria*, L., and *Epinephele tithonus*, L., were impressed on paper in a most accurate and finished style. Mr. W. H. Tugwell noticed that the scales of the wings were, of necessity, reversed, and that the body, eyes, antennæ, etc., were painted in. The transfers were from the well-known dealer in natural history specimens, Aug. Hoffmann.

Mr. H. McArthur explained and illustrated an ingenious method of securing an insect by means of a doubled slip of paper or cardboard, when, by accident or otherwise, the pin through the thorax had become useless.

Mr. R. Adkin exhibited a bred series of *Spilosoma mendica*, Clerck., from larvæ found in Aberdeenshire, and noted that the males showed a tendency to a lighter, *i.e.*, brownish colour. Mr. Weir remarked that it was evident that there was not a fixed colouring as between male and female in this species, and Mr. Tugwell referred to the fact that from Barnsley and Huddersfield two very distinct forms of the male of *S. mendica* are obtained; those from Barnsley being pale, whilst from Huddersfield the form is a very dark one, as previously exhibited by Mr. G. T. Porritt.

Mr. Billups exhibited some curious and fantastic forms of Hemiptera, Homoptera, Hymenoptera, Neuroptera, Orthoptera, etc., sent from a mission station on the River Demerara, British Guiana, South America, and called attention to a fungoid growth attached to one of the specimens, a species of Homoptera. Mr. Billups said it closely resembled, if it was not the actual species known as *Torrubia robertsii*, which attacks certain larvæ in New Zealand. Mr. C. G. Barrett remarked that the fungus referred to was similar to that occasionally found on a species of Noctuæ, *i.e.*, *Agrotis strigula*, Thnb., = *porphyrea*, Hb., which he had found attached by it to the heath amongst which the moth rested.

Mr. R. Adkin exhibited a series of *Diurnea fagella*, Fb., from Lewisham, in illustration of the theories advanced in Mr. Mansbridge's paper, which was read at the previous meeting, and remarked on the tendency to melanism shown by this species, *Eupithecia rectangulata*, L., and *Miana strigilis*, Clerck., in the London District.

Mr. H. McArthur said that dark specimens of *D. fagella* were to be taken in a wood four miles from Brighton; and Mr. Tutt thought the dark forms were more readily taken at

night when the species was in greater abundance, and that the lighter forms were those usually noticed by day. Mr. Robson, of Hartlepool, who was present as a visitor, said that black examples of *Xylophasia monoglypha*, Hufn., (*polyodon*, L.), occurred with the normal form on some nights, but not on others, and he considered that atmospheric influences, when the insect is on the wing, enter largely as a determining factor into the question. Mr. C. G. Barrett cited as a curious fact that, out of a large number of *Arctia caia*, L., bred, seven of the variety with yellow hindwings, had emerged on the same day (*vide* meeting, November 26th, 1891; exhibit by Mr. J. A. Cooper, of Leytonstone). Mr. Robson mentioned a similar instance; he said that from ten pupæ of *Vanessa antiopa*, L., sent to this country from Canada, nine imagines emerged directly after reaching Liverpool, and four of these were the variety without the blue marginal spots, and with broad yellow borders running inwards. On the tenth pupa being opened it was found that the butterfly contained therein was of the same form (var. *hygiæa*). Mr. J. A. Clark said that the proportion of dark forms of *D. fagella* was fully equal to that of the lighter ones in Epping Forest, and he did not look upon the dark specimens as any particular variety. Mr. Weir stated that he could not recollect any dark forms of this species in his earlier collecting days.

The President called upon Mr. Robson, and expressed the pleasure of the meeting in seeing him present, and the interest of the members in any notes or exhibitions which he might contribute. Mr. Robson then handed round a box of insects for the inspection of members, and drew attention to a short series of *Spilosoma mendica*, Clerck., one example, a female with cream-coloured fore-wings, was bred at Hartlepool. He said that the species was common in Northumberland and Durham along the coast, and was usually of the ordinary form; there were, however, some males of a colour intermediate between the English and Irish forms. Mr. Barrett said that the particular variety shown differed from the usual form in the same way as northern specimens of *S. menthastri*, Esp., did from those from southerly localities. Mr. Robson had also for exhibition dark specimens of *Smerinthus populi*, L., from Aberdeen, and light forms (female) bred from Hartlepool; also two light varieties of *Zygæna filipendulæ*, L., from Mr. Harwood, of Colchester. Mr. R. Adkin stated that *S. mendica* was not a common species in Scotland, and Mr. Tutt said that Mr.

Fenn had exhibited two bred females of the species, which very nearly approached the variety shown from Hartlepool. Mr. Clark also mentioned a drab specimen from the Wood Street portion of Epping Forest.

Mr. J. Jenner Weir read a paper on "Isochromatous Lepidoptera" (page 132).

MARCH 9th, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Mr. J. Jenner Weir, in exhibiting some specimens of *Diurnea fagella*, Fb., which he had himself taken about fifty years ago, said that in those days none but pale-coloured specimens of the insect were found in the localities he collected in. It appeared now that the specimens of the moth taken near London were generally much darker, and Mr. Adkin had stated, at the last meeting of the Society, that he had of late years observed a decided increase in the darkening of the wings of this species. Mr. R. Adkin remarked that the specimens exhibited by Mr. Weir were certainly as light as any now taken in the London district.

As a proof of the mildness of the present spring, Mr. Weir mentioned that his brother, Mr. Harrison Weir, had captured an example of *Vanessa io*, L., at Sevenoaks, on February 19th last; and that *Gonopteryx rhamni*, L., was flying in his garden at Beckenham on March 9th. Mr. Fenn mentioned that *G. rhamni* had been noticed very commonly in the neighbourhood of Leatherhead as early as the end of February, and Mr. Billups said he had, on the previous day, (March 8th) observed four specimens of this species on the wing at Dulwich.

A discussion ensued as to the probable occurrence of *Polyommatus dispar*, Haw., at Camberwell nearly fifty years ago. Mr. Fenn said that he had heard of specimens from Shooter's Hill Wood, near Woolwich, and Mr. Tugwell mentioned two specimens which he traced to the keeper of Saye and Seal Park, Kent, also fifty, or more, years ago. Mr. Hawes expressed doubts as to these reports, but Mr. Barrett thought that as the marsh-land of the Cambridge and Norfolk district, which was the original home of the species, gradually became drained and broken up, the butterfly, under the instinct of self-preservation, would migrate to similar though less extensive spots, and Mr. Tugwell suggested the marshes in the Canterbury neighbourhood as affording suitable food and shelter. Mr. Tutt agreed with Mr. Tugwell, and inquired if

the species which represented *P. dispar*, on the continent, was confined to marshes. Mr. South replied that he understood that *rutilus*, which was the continental representative of *P. dispar*, was always found on ground of a marshy character.

Mr. Tutt mentioned that the species referred to as *Melanippe galiata* by Mr. Mansbridge in his paper of February 9th, was correctly named, but that the insect was not captured in the woods, but on the outskirts; and Mr. Tugwell confirmed this by showing a series from the same locality, *i.e.*, Huddersfield. Mr. Barrett said that these specimens were of the same form as those taken on the Lancashire coast; specimens from Wallasey, Cheshire and Malahide, Ireland, had a broad and sharply-defined fascia on the fore wings.

Mr. R. Adkin exhibited, for Mr. C. H. Watson, a specimen of *Pieris brassicæ*, L., bred from larvæ found in a garden at Streatham. The specimen, a female, is peculiar in having the two spots connected by a blackish band, a similar mark also connecting the upper spot with the apical patch. It was noted by several members that this specimen approached very nearly *P. cheiranthi*, Hb., from the Canary Islands. Mr. Watson also exhibited (through Mr. R. Adkin) two specimens of *Apatura iris*, L., both females, bred from larvæ taken in the New Forest in the autumn of 1891. The larvæ hybernated from about 15th October, 1891, to April 11th, 1892, pupating June 26th, and July 8th, and emerging as perfect insects on July 11th, and July 26th, 1892, respectively. Mr. Tugwell drew attention to the fact that two forms of the female of this insect were found in this country, *viz.*, those with the band on the upper wings pure white, and some, as those from Chattenden, Kent, having the band ochreous-white, and Mr. Frohawk agreed with Mr. Tugwell as to the colour of the band in Kentish specimens.

Mr. G. B. Routledge exhibited a small collection of butterflies from Algiers, the south of France, and Switzerland, including from Algiers *Euchloë eupheno*, L., *Pararge egeria*, L., *Gonopteryx cleopatra*, L.; from Hyères, *Melanargia syllius*, Hbst., *Thais rumina* var. *medesicaste*, Ill., and *Limenitis camilla*, Schiff.; from Switzerland, *Polyommatus virgaureæ*, L., females, and *Hipparchia statilius*, Hufn.

Mr. R. Adkin exhibited a series of *V. urticæ*, L., bred during the summer of 1892, in Sutherlandshire, N. B. The general tone of colour in these specimens was somewhat dark, and the markings well produced and sharply defined. Also,

by way of contrast, a bred specimen of the same species from the Essex coast, this being unusually light in colour.

Mr. H. A. Sauzé had for exhibition a small collection of Ichneumonidæ, all the specimens having been captured, and Mr. Billups congratulated Mr. Sauzé on the careful setting and mounting of his captures.

Mr. Billups announced that he had a collection of birds eggs numbering some five hundred, and comprising about two hundred species, which had been placed at the disposal of members of the Society interested in Oology. A discussion ensued as to the advisability of the Society adding birds' eggs to its collections.

Mr. Jenner Weir read the following notes on "Mimicry in Lepidoptera," and exhibited many specimens in illustration:

"The exhibition I make this evening illustrates one of the aspects of the phenomenon of Mimicry which has not received the attention it deserves. If a comprehensive view be taken of the Rhopalocera, it will be found that mimicry exists in three out of the four families into which they are divided by the most modern systematists, viz., the Nymphalidæ, Lycænidæ, and Papilionidæ; and that where certain species in a genus are mimics, it is frequently found that other closely allied genera also contain mimicking species. These reflections have arisen in my mind by following out a suggestion made by one of our members, Mr. Tutt, that I should look through my cabinets to find subjects of sufficient interest to bring under the notice of the Society. In the Nymphalinæ there is a remarkable mimicking group formed by *Hypolimnas*, *Pseudacræa*, *Euripus*, *Hestina*, and two or three other genera, found in the African, Indian, and Australian Zoögeographical regions, which well illustrate the facts I propose to deal with.

"On the present occasion, I shall draw attention to those only from the African region, where the species mimic the two protected sub-families Danainæ and Acræinæ. *Limnas chrysippus*, Linn., is a trimorphic species, the type, the form with white secondaries, *L. alcippus*, and the plainly coloured *L. klugii*, without the black tips to the primaries and white sub-apical bar; all these forms are closely mimicked by a similar trimorphic condition. Of the females only of *Hypolimnas misippus*, Linn., the similar character of the names given by Linnæus shows that he thought them related congenerically. Cramer fell into the same error, and named the form which mimics *L. chrysippus*, *H. diocippus*.

"On the western coast of Africa the black and white species of *Amauris*, *A. niavius*, and *A. enceladus* are very common, and are accompanied by their mimics *Hypolimnias anthedon*, and *H. dubius*. In more Southern Africa, the butterflies of the genus *Nebroda* have the secondaries with the disc broadly yellow, and this marking is exactly mimicked by *Hypolimnias mima*. The other examples exhibited show the allied genus *Pseudacræa* to be close mimics of the protected *Acræine* butterflies; *Acræa euryta* is very nearly mimicked in both sexes, which are widely different, by *Pseudacræa eurytus*; *Acræa accara* by *Pseudacræa trimenii*; lastly, a variety of *Acræa enceladus* is of the same pattern and colour as *Limnas chrysippus* var. *alcippus*.

"The most remarkable fact in connection with the mimicry of *Acræa* and *Pseudacræa* is, not only that the colour and markings are accurately mimicked, but the shape of the wings is altogether quite different in *Acræa* from that of *Hypolimnias*; yet in the mimicking *Pseudacræa* the form of the wings is precisely similar to that of *Acræa*; approximately in shape to that of a dragon-fly. We must be clearly understood that the mimicry often goes beyond a mere accurate resemblance in colour by the mimic to the model, for the shape of the wings of the mimic is not rarely profoundly altered."

A discussion ensued, in the course of which Mr. Weir referred to the fact that Mr. Belt had found non-scented species eaten by birds, whereas the scented ones were not eaten; and Mr. South said he believed that mites do not as a rule attack Danaine butterflies in collections.

MARCH 23rd, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Messrs. L. W. Bristowe and W. Bond-Smith were elected members.

Mr. R. Adkin exhibited a small collection of butterflies from Sutherlandshire, N.B., including *Pieris brassicæ*. L., *P. rapæ*, L., *P. napi*, L., *Argynnis selene*, Schiff., *A. euphrosyne*, L., *A. aglaia*, L., *Epinephele ianira*, L., *Cænonympha typhon*, Rott., and *Thecla rubi*, L., and remarked on the general similarity of the forms shown to those prevalent in the South of England. It was noticed, however, in the specimens of *C. typhon* exhibited, that although there was a considerable range of variation in colour, in none were the dots on the hindwings prominent, as is the case in many of the Rannoch specimens. The specimens of *A. selene* and *A. euphrosyne* exhibited were remarkable

in their wonderful similarity to each other, the points of difference being so modified as to make it difficult to distinguish with certainty between the two species

Mr. H. Moore brought up for exhibition a striking example of fasciation in the young wood of the Sallow (*Salix caprea*) ; also, an example of the transference of the scales to paper of an Indian species of butterfly of the Nymphaline group.

Mr. T. W. Hall, remarking on Mr. Moore's exhibit of *Salix caprea*, recalled a similar instance in which the topmost flower of a foxglove stem was so enlarged, as to appear almost like a canterbury-bell ; and Mr. Mansbridge said he had seen the same peculiarity in *Liliums* in market gardens.

Mr. W. Mansbridge, referring to his paper read before the Society, February 9th, said that the species there spoken of as *Hybernia defoliaria*, Clerck., was a melanic form of *H. aurtiaria*, Esp., this fact having been brought under his notice by Mr. A. W. Dennis. He also exhibited a drawing of an antenna of each of these species, showing the difference between the two ; also *Odontopera bidentata*, Clerck., from Forres, N.B., darker than specimens from Horsforth, Yorkshire ; a strikingly light specimen of *H. leucophæaria*, Schiff., and a series of *Polia chi*, L., var. *suffusa*, darker than specimens from either Bradford or Huddersfield, and therein differing from Mr. Tutt's experience as expressed at a previous meeting.

Mr. H. A. Auld exhibited a species of the Coleopterous genus *Cassida* from Fort White, Upper Burmah.

Mr. J. M. Adye exhibited two living examples (forced) of *Diphthera orion*, Esp., the larvæ having been beaten out in the New Forest during the autumn of 1892. This exhibit was made in metal boxes, and a discussion thereupon ensued as to the comparative value of these boxes, Mr. Tugwell being of opinion that they would store heat, and so make the enclosed insects restless ; but Mr. Winkley observed that he had used this kind of box for such insects as *Argynnis paphia*, L., without any harmful results.

Mr. Jenner Weir exhibited in further illustration of the phenomena of mimicry, *Nebroda echeria*, var. *jacksoni*, which was closely mimicked by both a Nymphaline and Papilionine species, viz. *Hypolimnas mima*, and *Papilio cenea*, ♀, the latter species being the southern form of *Papilio merope*, which was remarkable for the polymorphic and polychromatic varieties of the female. *Amauris niavius*, also mimicked by the *Hypolimnas anthedon*, and *Papilio merope*, the black and white form of the female of that species from Western Africa. *Caduga tytia* from Northern India, which was closely mimicked

by the Nymphaline *Hestina nama* and the Papilionine *Cadugöides agestor*. He stated that, "In the first triplet the lower of the three species were yellow over the basal half of the wing; in the second triplet they were white at the base; and in the third triplet the ground colour of the lower wings was dull red, with whitish streaks radiating from the base. The three Papilionine species were all very aberrant in coloration, and the tailless females of *Papilio cenea* and *Papilio merope* were utterly unlike the males of those species, which had well-developed tails; indeed, so unlike were they to their partners, that the late Mr. Hewitson could not believe that *Papilio merope* 'indulges in a whole harem of females, differing as widely from it as any other species in the genus.'"

Mr. Weir referred to the fact that the white birds commonly sold as Ptarmigan (*Lagopus mutus*) were in reality only Willow Grouse (*Lagopus albus*), the former being identified by a black streak through the eye. A discussion followed, in which Mr. Tugwell and Mr. Adkin took part. Mr. W. Manger mentioned that many Waxwings (*Ampelis garrulus*), usually considered an uncommon bird, were now to be seen in Leadenhall Market, London, having been sent from Yorkshire.

APRIL 13th, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Mr. H. Billinghamurst was elected a member.

Mr. R. Adkin read the following extract from a letter addressed to Mr. Billups by Mr. Cockerell, and exhibited the leaves upon which were the species of Coccidæ referred to:—"I have been working hard at Coccidæ of late, and find them most interesting. There is a splendid field open for our microscopists in this line. As you can see in *E.M.M.*, new species are still to be found in England, and you can often find exotic species on imported plants. The females, under the scales can be mounted for the microscope, after clarifying in caustic potash or soda. They are quite easy to prepare. I wonder whether you could get some of the members of the S. London Society to take up this subject. I would send lots of material, and, if required, would name species for anyone (though you have better men in England for European spp.—Messrs. Douglas and Newstead). I send now two species, and some duplicate material that you can give away to anyone interested. You might perhaps show the specimens before the Society, and say that anyone can have some who wishes."

Mr. Manger exhibited *Dorippe japonica*, a small crustacean from Japan.

Mr. Adkin exhibited a collection of Sphinges and Bombyces from Sutherlandshire, N.B., consisting of *Sesia scoliiformis*, Bork., *Arctia caia*, L., *Dicranura vinula*, L., *Orgyia antiqua*, L., *Nemeophila plantaginis*, Schiff., *N. russula*, L. (the male specimen with smoky hindwings), and *Odonestis potatoria*, L.

Mr. Perks exhibited a bramble leaf covered by a microscopic fungus, found at Chessington, Surrey, on 3rd April.

The Secretary, Mr. H. Williams, read a letter from Mr. Robson, requesting the aid of members of the Society in filling up forms which should give results as to "sugaring" in different parts of the country, and so lead to conclusions on this subject.

Mr. Turner reported the capture of *Eupithecia nanata*, Hb., *Ematurga atomaria*, L., and larvæ of *Thera firmata*, Hb., *T. variata*, Schiff., and *Ellopiæ prosapiaria*, L. (*fasciaria*, Schiff.), and Mr. Carpenter reported the capture of *Thecla rubi*, L., at Eynsford, Kent, on April 3rd, and *Syrichthus malvæ*, L., on April 9th.

Mr. Weir asked for specimens of the first or April emergence of *Polyommatus phlæas*, L., and stated that he had never seen any but June and August specimens of this species.

The remainder of the evening was devoted to a discussion on the proposed excursions of the Society during the ensuing summer.

APRIL 27th, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Mr. Tutt exhibited a series of *Tapinostola concolor*, Gn., from Cambridgeshire, and remarked upon the extremely restricted range of this species; Captain Vipan being the most successful in obtaining it; Mr. Hutton captured several in Cambridgeshire. Mr. Tutt pointed out the confusion that had arisen with regard to the nomenclature of this insect in consequence of Hübner's figure of *T. extrema*, Hb., having blackish cilia.

Mr. Weir mentioned that specimens of *Polyommatus dispar*, Haw., had fetched £6 each on Tuesday last at Stevens'.

Mr. W. H. Knight exhibited a very long and variable series of *Bombyx castrensis*, L., bred from larvæ obtained on the banks of the Medway, and observed that his experience was, that unless the larvæ were, say, within a week of being full fed when taken, they usually refused to feed, and seldom came

to perfection. Mr. R. Adkin and Mr. Tutt corroborated this view, and remarked that this species was especially resentful to a change of habitat.

In proof of the recent extraordinarily fine weather, Mr. Tutt mentioned that *Melitæa cinxia*, L., and other June species were now on the wing in Guernsey, and that *Lyçena argiolus*, L., was flying at Hereford during the first week in April. Mr. R. Adkin drew attention to the rare occurrence of blackthorn (*Prunus spinosa*) and whitethorn (*Cratægus oxyacantha*) being in blossom at the same time.

In the course of some remarks upon *Colias edusa*, Fb., Mr. Tutt said it had a good chance of hybernating here last winter, if it ever did so in this country. In Algeria and Morocco it could be got in all its stages, with the exception of the egg, nearly the whole year through, and that in the Mediterranean littoral, it practically did not hybernate at all, but one brood followed the other in rapid succession.

MAY 11th, 1893.

C. G. BARRETT, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. R. South exhibited a series of *Diurnea fagella*, Fb., taken in a wood in Buckinghamshire, the light and dark forms being in about equal proportions. Mr. South said that the trees in this particular wood were dark on their western side, with a lichenous growth, and on their eastern side pale coloured; and at the time he collected these specimens the wind was in the east, and consequently all the moths were at rest on the western side of the trees, the dark ones being very inconspicuous. He thought that if this were generally the case when this species was on the wing, it would naturally tend to produce a dark race.

Mr. Barrett in referring to the difficulty of breeding *Bombyx castrensis*, L., away from its natural haunts, said that the larvæ should be well wetted at times, and exposed when possible to the sun; and he thought the absence of the latter in some seasons might account for the sporadic appearance of this species. Mr. Turner said he had bred *B. castrensis* very successfully on rose leaves dipped in salt water. This discussion was continued by Messrs. Tutt, Frohawk, and South.

Mr. Adye exhibited long series of *Moma orion*, Esp., *Eurymene dolabraria*, L., *Amphidasys betularia*, L., *Hylophila prasinana*, L., and *Dasychira pudibunda*, L., and odd specimens of *Acronycta alni*, L., *Notodonta chaonia*, Hb., *N. dodonea*, Hb.,

N. trepida, Esp., *Selenia illustraria*, Hb., and others. The larger number of these were bred in March and April, from larvæ taken in the New Forest last autumn; the pupæ having been kept in a room without a fire since the middle of January, but always with a fire before that time. Mr. Tutt said that on the 6th May, *Lycæna bellargus*, Rott. was on the wing in Kent; also *Nemeophila plantaginis*, L., *Euclidia mi*, Clerck., *E. glyphica*, L., etc., and pupæ of *Vanessa urticæ*, L., were also found; whilst Mr. Turner said he had also found the young larvæ of *V. urticæ* on the same date.

Mr. Jäger said he had been breeding *Cidaria truncata*, Hufn. from the egg, and that although the young larvæ were on one occasion exposed to the snow, they were in no way injured, and the perfect insects were now emerging.

Mr. South reported having bred *Coccyx strobilella*, L., from cones of spruce fir picked up in Buckinghamshire.

MAY 25th, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Mr. Adkin exhibited a bred series of *Cidaria suffumata*, Hb., from Forres, with bred series from Dover and Box Hill for comparison; also a bred series of *Lobophora carpinata*, Bork. (*lobulata*, Hb.), from Rannoch, including one extreme banded form, with southern series for comparison.

Mr. Filer exhibited a specimen of *Syrichthus malvæ*, L. (*alveolus*, Hb.), var. *taras*, Meig., from Epping.

Mr. C. G. Barrett exhibited a box containing more than twenty species of the Psychidæ from the continent of Europe, and especially desired to gain further information with regard to these little known and obscure insects. He stated that the larvæ lived in cases, after the manner of the Coleophora, on furze, heath, grass, and the lichens of trees, rocks and bushes, and that many entomologists considered them to be Bombyces, not Tineina. Mr. Weir remarked that all the species seemed excessively local, and gave his experience with *P. villosella*, Och., stating that the female did not leave the case, that the eggs were laid and hatched within this shelter, and that most likely the first meal of the young larvæ was the body of their mother.

Mr. West, of Streatham, on behalf of Mr. Trenerry, exhibited a male and female of *Pieris daphnidice*, L., captured by a boy at Plymouth; also a specimen of *Smerinthus tilix*, L., in which the rosy tint was very strongly developed, making a very beautiful variety.

Mr. Turner exhibited a long series of *Hybernia leucophæaria*, Schiff., varying from specimens with but few markings on a light ground, to others which were very dark, with the transverse lines obliterated, selected from various South London localities; a specimen of *Panolis piniperda*, Panz., from Westerham, in which green was the prevailing colour; also hibernated specimens of *Pterophorus monodactylus*, L., taken on February 18th, this year.

Mr. Warne exhibited a nodule of kauri gum from New Zealand, enclosing a large Longicorn beetle.

Mr. Weir exhibited a species of Hippoboscidæ taken from an exhausted house-martin (*Chelidon urbica*, L.), most likely *Stenopteryx hirundinis*; also a mass of eggs and young larvæ from the wild rose (*Rosa canina*), which appeared to be those of *Hemerophila abruptaria*, Thnb. He earnestly requested members to make notes of all unusual occurrences during the present phenomenal season, and report to the Society the results of their observations and experiences. Mr. Adkin remarked that a considerable number of species had appeared in his breeding cages which had been two years or more in pupa.

Mr. Perks showed a large specimen of a Polyporus full of Coleopterous larvæ, taken at the Society's field meeting at Horsley.

Mr. Step called attention to a toad (*Bufo vulgaris*) from Bookham, having many characters of the common frog (*Rana temporaria*). It possessed abnormally long legs and feet, its skin was comparatively smooth and thin, although after changing the skin the tubercles became slightly perceptible, the parotid glands were scarcely developed at all, but the *membrana tympani* and the angular hump of the frog were very visible; it walked, not jumped, and dragged its hind limbs somewhat; it was not able to swim so well as a frog. The posterior limbs were very long—about one-sixth longer than the extreme length of the trunk—and were very distinct throughout their length, not being, as usual with toads, half buried in the capacious extension of skin from the femur to the humerus. It was suggested that the specimen was a hybrid. In the course of the discussion which followed, Mr. Weir remarked that he had never seen so remarkable a specimen. Reference was also made to the white var. of the frog formerly existing in the Zoological Society's Gardens.

Mr. Turner then read the Report of the Society's field-meeting at Horsley, on May 13th, which had been so successful and enjoyable (page 134).

JUNE 8th, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*,
in the Chair.

Mr. F. W. Frohawk exhibited a variety of *Melitæa aurinia*, Rott., a most remarkable form, especially on the underside, the normal orange-tawny colouring being replaced by fulvous-brown. On the whole of the outer half of the right secondary the markings are missing, excepting the sub-marginal row of black dots; while on the left secondary, the sub-marginal band is slightly indicated, the usual cream-coloured spots at the base of the secondaries being replaced by black markings. The specimen is a fine female, bred from Penarth pupa. May 17th, 1893.

A very similar aberration of the same species was also shown by Mr. Frohawk on behalf of Mr. Carpenter.

Mr. H. A. Auld exhibited a specimen of *Spilosoma urticæ*, Esp., deficient in the usual row of black spots down the centre of the body; also a fine bred series of *Phibalapteryx vitalbata*, Hb.

Mr. R. Adkin exhibited a splendid series of *Asteroscopus nubeculosa*, Esp., from Rannoch, bred 1893. Two of these were from larvæ fed up in 1890, thus having been three winters in pupa; also a series from larvæ fed up in 1891, thus having passed two winters in pupa; and he stated that it was not unusual for this species to remain two years in the pupal state. Mr. Weir referred to the view held by some, that certain insects resisted any forcing, and instanced the second brood of *Pieris napi*, L. In the discussion which followed, Mr. Barrett contended that it was of the utmost importance that a species like *A. nubeculosa* should have the power of delaying their emergence, should the weather be too unfavourable; and Mr. Weir remarked that if it was the habit, say, of *Eriogaster lanestris*, L., to all emerge one season, it might in consequence of successive inclement springs be the means of exterminating that species.

Mr. Jenner Weir exhibited a specimen of *Aporia cratægi*, L., which he generously placed in the Society's collection, and read the following note: "In the year 1839, early in the month of June, I determined to commence to collect the British Lepidoptera, being at the time at Keymer, Sussex. The first insect I captured was *Aporia cratægi*; it was very common, and had been so for many years previously in that locality. Not having proper boxes with me, I took but four

specimens, thinking I could easily obtain a series in subsequent years. In 1840 I saw but one example; and although I visited Keymer at the proper season for many years afterwards, I never saw another. One of these four insects I desire now to place in the cabinet of the Society."

Mr. Weir added that *A. cratægi*, was formerly very common in the New Forest, but of course was now extinct; also that large numbers have been lately liberated in the neighbourhood of Windsor.

An interesting discussion was then opened, by Mr. Winkley inquiring what became of the salmon (*Salmo salar*) when they descended the rivers, as they were seldom caught at sea or round the coast; Mr. Barrett and others taking part.

As a further instance of the phenomenal spring, Mr. Weir stated that cherries had been gathered on the 15th May; whilst Mr. Frohawk recorded the extraordinary fact of *Limenitis sibylla*, L., having been taken in the New Forest on the 22nd May, by which date nearly all the larvæ of this species had pupated.

JUNE 22nd, 1893.

E. STEP, Esq., in the Chair.

Mr. Turner stated that according to his experience this season, sugar was not a success, as in his neighbourhood recently, *Acronycta megacephala*, Fb., and one species of the genus *Caradrina* were all that appeared; he had, however, netted in his garden forty-seven *Eupithecia isogrammata*, H.S., flying around the clematis. Mr. Winkley said it appeared to him that moths were more abundant in his garden after it was watered, and that he knew of seventeen *Apamea ophiogramma*, Esp., having been taken at Ealing, although no ribbon-grass was growing near.

Mr. West, of Greenwich, exhibited two pieces of rock from Blackheath, out of the Woolwich and Reading beds in the Lower London Tertiaries. These were a mass of mollusca, which Mr. Step stated consisted chiefly of the *Cyrena* and *Ostrea* and *Paludina*.

Mr. Perks exhibited living specimens of an aquatic Coleopteron belonging to the genus *Ochthebius*; also the ivy-leaved duckweed, *Lemna trisulca*, from Horsington Hill, near Hanwell.

Mr. Turner read the report of the Society's excursion to Oxshott, on the 10th of June (see p. 136).

JULY 13th, 1893.

C. G. BARRETT, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. J. J. Wolfe, of Skibbereen, Co. Cork, Ireland, was elected a member.

Mr. C. Oldham exhibited two boxes of insects, including, amongst others, interesting varieties of *Odonestis potatoaria*, no less than five males being of the female coloration, *Abraxas sylvata*, Scop., from Epping Forest, this being the second record of the species from that locality. Also a specimen of *Plusia moneta*, Fab., taken on the 2nd June at Woodford, the first capture of this species recorded from Essex; Mr. R. Adkin remarked that *P. moneta* appeared to be very gradually distributing itself over the country.

Mr. West, of Streatham, exhibited specimens of *Sesia bembeciformis*, Hb.

Mr. R. South showed a remarkable female specimen of *Triphaena pronuba*, L., it being the typical form on one side, and the variety *innuba*, Tr., on the other. Mr. South also exhibited specimens of *Coccyx ochenheimeriana*, Zell., and a very variable series of *C. tædella*, L., from Middlesex.

Mr. C. Fenn exhibited long-bred series of *Dicranura bifida*, Hb., bred from ova obtained last season at Bexley, *Boarmia roboraria*, Schiff., from the New Forest, and *Notodonta dictæa*, L., bred from ova obtained at Deal.

Lengthy series of *Pieris brassicæ*, L., were exhibited by Messrs. Adkin, South, Frohawk, and Briggs. Those shown by Mr. Adkin were from Eastbourne, Rannoch, Sutherland, etc., and he pointed out the manner in which the coloration of the tips of the wings varied from dove-grey to almost black. One shown by Mr. South was hardly above the size of *Pieris rapæ*, L.; whilst another had the black tip deeply indented on its inner edge. Mr. Briggs' specimens were from Kent, Surrey, New Forest, Yorkshire, Essex, Nottingham, Durham, Isle of Man, Isle of Lewis, etc.; and he said he thought that those having very light tips came principally from the Midland counties, and occurred chiefly in the first brood and in the male insect. Mr. Frohawk's series of *P. brassicæ* comprised, amongst others, a great number bred from pupæ received from Harwich, and showed a great deal of variation in the depth of the black markings, the undersides being very dusky and almost precisely similar to the southern French type, a series of which was also exhibited, with normal forms from Kent and Surrey, having the ochreous coloration of the underside in strong contrast to those from Harwich. Attention was

also drawn to the fact that the black apical markings of this species become blacker after the insect has flown, in consequence of the white scales on the tips becoming dislodged. Mr. Frohawk and Mr. Adkin both agreed that most probably the dark *P. brassicæ*, L., from Harwich, were the descendants of immigrant parents.

Mr. H. Moore exhibited three Harlequin beetles, *Acrocinus longimanus*, from Trinidad, Demerara, and Brazil.

Mr. H. A. Auld showed an almost white variety of *Lomaspilis marginata*, L., from Folkestone; also a series of *Argynnis paphia*, L., var. *valesina*, Esp., from the New Forest, and mentioned that a few *Colias edusa*, Fb., had been taken at Folkestone.

Mr. Step had a number of pupæ of the bacon beetle, *Dermestes lardarius*, L., and said that a large quantity of the larvæ had been sent by a correspondent to the Editor of the "Fishing Gazette" as a new fishing bait.

Mr. Barrett said that a friend of his, on opening a drawer containing books, found in it about thirty Lepidopterous larvæ about three-fourths of an inch long, with tubercles on the third pair of legs, which he suggested were most probably those of *Diurnea fagella*, Fb. The larvæ were in earthen tubes, and seemed paralysed, and were supposed to have been stored by one of the fossorial Hymenoptera as food for its young. Messrs. Step, South, and Fenn took part in the discussion which followed, Mr. Step mentioning that the leaf-cutter bees, *Megachile*, will frequently take possession of a piece of lead piping, or anything else with a hole in it.

Mr. Frohawk said the white-spotted form of *Argynnis paphia*, L., was again common in the New Forest; and Mr. Turner mentioned that Mr. Croker had captured *Tapinostola bondii*, Knaggs., *Dianthæcia albinacula*, Bork., and *Sesia chrysidi-formis*, Esp., at Folkestone.

Mr. Turner exhibited two varieties of *Argynnis selene*, Schiff., in which the central markings of each wing were more or less coalesced, forming imperfect fasciæ. He also exhibited *Eupæcilia nana*, Haw., and several other Tortrices.

Mr. Briggs exhibited a portion of the outer covering of a tree wasp's nest, having stripes of brilliant blue all over it, these stripes having been made from some blue paper or other material of that colour.

JULY 27th, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Mr. A. Robinson exhibited a magnificent series of *Callimorpha hera*, L., bred from ova obtained from a female captured in Devonshire in August, 1892. He mentioned that among those he bred, a large number were deformed in the hind wings, and principally in the left one. Mr. Robinson had also two specimens of *Dicranura bicuspis*, Bork., from Tilgate Forest, one being a very pale variety.

Mr. H. Williams exhibited five pupæ of *Leucophasia sinapis*, L., for the purpose of showing the gradual development of the imago, the pupæ being 4, 5, 11, 16 and 18 days old respectively; also an empty pupa case, the imago from this having emerged on the 16th day. The ova were laid on the 26th and 28th of May, the first hatching on the 6th June. The young larvæ fed upon *Lotus corniculatus*, the first one pupating on the 9th July. An imago from one of the pupæ exhibited emerged during the course of the evening.

Mr. Turner exhibited a fine series of *Pempelia palumbella*, Fb., from Oxshott, and a few *Thera variata*, Schiff., including a unicolorous specimen, several *T. firmata*, Hb., and also a large number of *Tineina*, etc.

Mr. Dennis brought a box of *Thecla betulæ*, L., which had been bred this year at the end of June, one female having the orange band slightly smaller than usual.

Mr. R. Adkin exhibited specimens of *Smerinthus populi*, L., from Lewisham, Sutherland, and the New Forest, three of the specimens being of that very light brown form which sometimes occurs, one from each of the localities named; also a few *Smerinthus ocellatus*, L., bred from larvæ found at Lewisham.

Mr. Barrett exhibited the larvæ of *Diurnea fagella* mentioned at the last meeting. These larvæ, if not actually alive, were in a state of very fresh preservation, and Mr. Weir said he thought there was no doubt that they had been stored by one of the Mason Wasps as food for its young.

Mr. Perks exhibited a fungus from the stem of a date palm.

Mr. Step reported that the frog-like toad previously referred to, had since died, but he was no nearer its elucidation. He exhibited the following species of galls from Epsom, viz., *Andricus fecundatrix*, Htg., *Neuroterus lenticularis*, Olivier., *Andricus ostreus*, *Cynips kollari*, *Rhodites nervosus*, Curt., *R. rosæ*, Htg., and *R. eglanteriæ*, Htg., and

made some interesting remarks thereon, expatiating upon the advantages of studying the Phytophagous Hymenoptera. A discussion ensued in which Messrs. Step, Barrett, Weir, and others took part.

AUGUST 10th, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Mr. Frohawk exhibited a specimen of *Macroglossa bombyliiformis*, Och., together with the species of humble bee (*Bombus agrorum*), which it mimics, both being captured in company over rhododendrons in the New Forest on the 21st of May, 1893.

Mr. Oldham exhibited specimens of *Apamea ophiogramma*, Esp., *Calymnia affinis*, L., and *Triphaena fimbria*, L., from Woodford.

Mr. Jenner Weir exhibited some cases which had been found under a sycamore by a neighbour of his, Mr. Tolhurst, at Beckenham. He said that attention had been called to these cases by seeing them hopping over a gravel track, a power which they retained for some days after they were obtained. The cases were circular discs about 13 mm. in diameter, and had been made from the upper cuticle of the sycamore leaf, forming one side, and silk the other. Upon examining the leaves of the tree, the round spots from which the cases were partly formed were plainly visible, and also the large blotch from which the larva had eaten the parenchyma. It was at first thought that they might be lepidopterous, and probably a species of *Tischeria*; but they were ultimately identified by Mr. McLachlan as the work of a saw-fly *Phyllotoma aceris*, Kaltenbach, a somewhat detailed life-history of which species is given by Charles Healy in the *Ent. Mo. Mag.*, iv., pp. 105-107 (1867), and a more complete account by Ritzema Box in the *Tijdschrift voor Entomologie*, xxv., pp. 7-16, pl. iii.

Mr. Weir also exhibited nearly adult larvæ of *Hemerophila abruptaria*, Thnb., and drew attention to the fact that the pair of prolegs were as usual in geometers fully developed, and that there were also two other imperfect pairs in front of these. He considered these very imperfect prolegs to be vestigial.

Mr. Robert Adkin exhibited a specimen of *Sesia asiliformis*, Rott. (= *cynipiformis*, Esp.), that he had reared from pupa received from the neighbourhood of Abbott's Wood, Sussex, and pointed out that the colour of the band on the left fore-

wing was yellow instead of red, and that the narrow costal streak of the same wing, although red at the base, assumed the yellow coloration for a considerable portion of its length, the red gradually giving way to the yellow; he regarded this specimen as of some interest, being another example of the change of colour from red to yellow in the Sesiidæ, and he believed in a species where the change had not been previously noticed. He also exhibited a series of *Spilosoma lubricipeda*, Esp., the descendants of Barnsley ancestors, and he believed the same stock from which the extreme radiated forms reared in some numbers of late had sprung, but in the most strongly marked specimens of the series now shown the tendency in that direction was not great.

The remainder of the evening was devoted to a conversation on the relative abundance or scarcity of Lepidoptera since the excessively hot weather of the past spring, in which Messrs. Weir, Oldham, Hall, Winkley, Frohawk, Adkin, Waller, and others took part, the consensus of opinion being that with one notable exception, namely, *Polyommatus phlæas*, L., which had been more or less abundant throughout the time from April last, Lepidoptera generally had been below the average in point of numbers.

AUGUST 24th, 1893.

E. STEP, Esq., in the Chair.

Mr. Dennis exhibited an example of the second brood of *Argynnis selene*, Schiff., captured on the 15th August at the Devil's Punch Bowl, Haslemere; it was very much below the usual size.

Mr. Turner showed specimens of the land molluscs, *Helix caperata* and *Bulinus acutus*, from Penzance. Mr. Step remarked that this last species is common on the coast in the western parts of England, where *H. caperata* is even more common, though not so strictly a coast species.

Mr. Carpenter exhibited *Syrichthus alveolus*, Hb., var. *taras*, Meig., captured in Abbott's Wood, May, 1893, a series of *Chariclea umbra*, Hufn. (*marginata*, Fb.), bred from Essex, July, 1893, and a series of *Tæniocampa opima*, Hb., bred from Lancashire, April, 1893, one female being very dark. As an instance of the effect on Lepidoptera of the hot weather, Mr. Carpenter mentioned that of a batch of young larvæ of *Argynnis euphrosyne*, L., which were dormant on the 17th June, several had again commenced feeding at the end of that month, and were now in the pupal state.

A conversation then took place regarding the extreme abundance of wasps this summer.

SEPTEMBER 14th, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Mr. H. A. Auld exhibited living larvæ of *Phorodesma smaragdaria*, Fb.; also two breeding cages for larvæ, the construction of which are fully described by Dr. H. G. Knaggs, in the Entomologist's Monthly Magazine for July last, p. 159.

Mr. South exhibited a series of *Spilosoma lubricipeda* vars. *satima*, Cr., and *radiata*, St., from Heligoland; a splendid var. of *Argynnis euphrosyne*, L., taken in Lancashire: a very pale var. of *Vanessa urticæ*, L., from Monmouthshire; two aberrant specimens of *Abraxas sylvata*, Scop.; an exceedingly small specimen of *Abraxas grossulariata*, L.; and an unusually blue specimen of *Procris statices*, L.; and also a series of *Zygæna trifolii*, Esp., containing almost all the known forms, with regard to which he remarked that although most authors say the border of the hind wings is broader in *Zygæna trifolii* than in *Z. loniceræ*, Esp., it would be observed that in the series he showed the border was of exactly the same width in some examples of each species, whilst in others it was wider in *loniceræ* than in *trifolii*.

Mr. Fenn and Mr. Tutt both remarked that the bluish form of *Procris statices*, L., was of occasional occurrence. Mr. Tutt said that the *Z. trifolii* captured by him in North Kent last year had nearly all of them six spots, where previously the five spotted forms were abundant, and that out of two hundred taken, only five were absolutely typical; in fact, were almost becoming *Z. filipendulæ*, L. Mr. Weir remarked that these two species do occasionally cross in a state of nature.

Mr. Fenn exhibited long series of *Spilosoma lubricipeda*, var. *radiata*, St., bred from ova received from Mr. Tugwell, the larvæ having been reared on the variegated elder; also long series of *Gnophos obscurata*, Hb., captured by himself at Folkestone in August, 1893, showing the banded and other forms, also series of the second brood of *Macaria notata*, L., reared from the egg. Mr. Fenn further exhibited examples of the spring and summer broods of *Selenia lunaria*, Schiff., and read the following notes thereon:

"The *spring forms* are from Eltham, Bexley, and Chatten-den; also a cross between Essex and Sutherland forms. The *summer brood* were bred in August, 1893; the parents being from Bexley, and bred from ova. The larvæ were reared on

birch. Curiously enough, out of some sixty or seventy pupæ only eighteen emerged, and seventeen of these were females. The remainder of the brood is awaiting exclusion in the spring. *Delunaria*, Hb., the summer brood, varies, as far as the specimens exhibited are concerned, from the spring brood in the following particulars, *i.e.*, they are rather larger, the markings more sharply defined, the coloration brighter, and the line beyond the middle of the forewing more distinctly vertical; but this last character does not appear to be constant. The Sutherland-Essex examples are a curious form, the ova from which they were produced were received from Mr. W. H. B. Fletcher of Worthing."

A considerable discussion took place with regard to the origin of the North English examples of *Spilosoma lubricipeda*, var. *radiata*. Mr. Tutt stating that Mr. Harrison, of Barnsley, took one in Lincolnshire, (not Yorkshire, as was first stated), the progeny of which had been bred indoors, but that it had not spread in a state of nature. Mr. Fenn remarked upon the probability of the parent specimen having been imported by a ship or otherwise.

Mr. Robert Adkin exhibited a series of *Thecla betulæ*, L., and read the following note:—"At a recent meeting of the Society Mr. Dennis exhibited this species, and remarked upon its early appearance this year, his series having been bred at the end of June, from larvæ taken in Epping Forest. The specimens now shown were bred from larvæ taken in the New Forest in the early part of June; they began to pupate about the 20th, and had nearly all assumed that state by the end of the month. The first imago emerged on July 16th, and the last on August 9th, both the larvæ and pupæ having been kept out of doors. The dates of the appearance of the two sexes were unusually clearly marked, and were as follows:—

| Males. | Females. |
|-----------|-----------|
| July 16—2 | |
| „ 18—4 | |
| „ 20—3 | |
| „ 23—1 | July 21—1 |
| „ 26—1 | |
| | „ 28—3 |
| | „ 29—1 |
| | „ 30—1 |
| | Aug. 2—2 |
| | „ 3—2 |
| | „ 4—1 |
| | „ 9—1 |

Thus only one female had emerged during the time that the

males were appearing, and the last female left the pupa just fourteen days after the last male. The weather, during the last week in July and the first few days of August, was somewhat cooler than it had been previously, and probably this caused the emergences to extend over so long a time." Mr. Adkin also exhibited a short series of *Pygæra pigra*, Hufn. (*reclusa*, Fb.), bred from larvæ taken in Sutherlandshire last autumn; the specimens had a brighter appearance than the ordinary southern type, owing chiefly to the redder-colouring of the usual chocolate markings.

Mr. J. Weir stated that during a tour he had lately made in Belgium, he was constantly on the alert to look out for the two species of *Colias*, *C. edusa*, and *C. hyale*, not only in the places he visited, but also when travelling on the railways. His journey commenced at Calais, and he then passed into Belgium, visiting Tournai, Mons, Namur, Huy, Dinant, Hastiere, Louvain, Ghent, Bruges, Ypres and Furnes, then re-entering France. He remained a few days at Dunkirk; thence back to Calais, and crossing the Channel to Dover, came home through Kent. During the whole of this journey he saw no *C. hyale*, and only one *C. edusa*: this he saw in a garden in the suburbs of Ghent.

Referring to *Heodes* (*Polyommatus*) *phlæas*, Mr. Weir said that the species had been very common in his garden at Beckenham this September, and that since the first of that month he had seen more of this species there than in the whole ten years he had lived at Beckenham. They were doubtless the third emergence of the butterfly, and it was clear, therefore, that the almost unprecedented hot and dry summer had favoured the species in a remarkable degree.

Mr. Tutt gave his experience of a day or two entomologizing in the environs of Paris about the 1st August, when *Colias hyale*, L., was in swarms,—many other things, such as *Lythria purpuraria*, L., *Agrophila sulphuralis*, L., *Acontia luctuosa*, Esp., etc., etc., being common.

The appearance of *Colias edusa*, Fb., was reported from Penzance, Folkestone, Hastings, Bournemouth, Sidmouth, etc., by Messrs. Turner, Fenn, Auld, and Enock; and it was also stated that the second brood of *Fidonia atomaria*, L., had appeared at Cuxton and Folkestone.

Mr. Enock exhibited specimens of wheat stems containing the pupæ of the Hessian-fly, *Cecidomyia destructor*, Say., from Sidmouth, where he said he had found it infesting the wheat and barley; also examples of *Chlorops tæniopus*, Mg., the destructive ribbon-footed corn-fly.

SEPTEMBER 28th, 1893.

J. JENNER WEIR, Esq., F.L.S., *President*, in the Chair.

Mr. R. South exhibited, on behalf of Mr. Sabine, an example of *Lycæna bætica*, L., and some splendid varieties of *Polyommatus phlæas*, L., captured at Dartford, Kent, on the 7th September: one of the latter was intermediate between the type and the var. *schmidtii*, Gerh., and others were almost black. Mr. Weir remarked upon the great geographical distribution of this species.

Mr. Frohawk exhibited a long series of *Polyommatus phlæas*, L., captured at Balham during the first week in September, 1893., showing great variation in size and markings. They were mostly brilliant in colour; two approached the var. *schmidtii*, and two were without bands on the secondaries, the usual copper band being replaced in those examples by deep black; also specimens from Shirley of large size and rich in colour. He also exhibited a living pupa of *Argynnis paphia*, L., the larva having fed up during the autumn, with a few others which hatched in July; also a larva of *A. adippe*, L., in its last stage; it emerged from the egg in August.

Mr. Jäger exhibited six specimens of *Lycæna arion*, L., captured by Mr. Bignell in Cornwall, last June; also a series of *Cidaria truncata*, Hufn., bred August last, from Aberdovey.

Mr. Fenn exhibited a series of *Dasycampa rubiginea*, Fb., bred September, 1893, from Devonshire, and a long bred series of *Acidalia aversata*, L. The female parent of this series was reddish in the ground colour, and had a dark central band. The offspring showed thirty-two banded and eight of the ordinary form; but, curiously enough, none of them had the slightest tint of red in the ground colour, all being of an uniform cold greyish ochreous. For comparison a series was also shown of specimens with pink and pinkish ochreous ground colour, both banded and ordinary; and three specimens of a form intermediate in colour between the pink and greyish ochreous. Mr. Fenn also exhibited *Nisoniades tages*, L., and *Ematurga atomaria*, L., both second broods taken commonly at Folkestone in the middle of August. A variety of *Tephrosia punctularia*, Hb., with two distinct white spots at the tip of the left fore-wing; an almost albino var. of *Eubolia bipunctaria*, Schiff., a curious var. of *Coremia unidentaria*, Haw., having a contracted band on the forewings, and a great number of specimens of *Acronycta rumicis*, L., from various localities, to show the local variation.

Mr. J. H. Carpenter showed a series of *Lycæna astrarche*, Bgstr., from Kincardineshire, taken in July, 1893; also a bred series of *Argynnis euphrosyne*, L., being a second brood. The parent of the latter was captured in Abbott's Wood, Sussex, in April last. The larvæ hatched in May, and were apparently in a dormant state during June and July; but directly the very hot weather set in, in August, they rapidly fed up, pupated during August and September, and produced the butterflies exhibited in the latter month.

Mr. R. Adkin exhibited a series of *Cymatophora duplaris*, L., taken in Sutherlandshire; they were all very dark specimens, ranging in tone of colour from smoky grey to blackish, all being much darker than the southern forms of the species.

Mr. Perks exhibited a specimen of the Lesser Whitethroat (*Sylvia curruca*, L.).

Mr. Jäger mentioned that a number of larvæ captured on *Impatiens noli-me-tangere*, L., in Germany, had turned out to be *Cidaria silaceata*, Hb., instead of *Cidaria reticulata*, Fb., as he had hoped.

A paper communicated by Mr. F. W. Hawes was then read; two plants of *Rumex acetosa*, L., having thereon a number of ova and young larvæ of *Polyommatus phlæas*, L., being exhibited in illustration of the same (page 138).

OCTOBER 12th, 1893.

J. JENNER WEIR, Esq., F.L.S., *President*, in the Chair.

Mr. Arthur Hall was elected a member.

Mr. Carpenter exhibited long series of the white spotted form of *Argynnis paphia* L.; also var. *valesina*, Esp., and a small form of the same species, all from the New Forest. Mr. Tutt remarked that when *Argynnis paphia*, L., was white spotted it was frequently tinted with green, as in *valesina*, and this sometimes even occurred in the male sex, though more frequently in the female.

Mr. Frohawk exhibited the following butterflies in order to show the variation in size: *Vanessa cardui*, L., bred $2\frac{3}{4}$ in.; captured $1\frac{3}{4}$ in. *V. io*, L., bred $2\frac{7}{8}$ in.; bred $1\frac{7}{8}$ in. *V. atalanta*, L., bred 3 in.; captured $1\frac{7}{8}$ in. *Argynnis paphia*, L., captured male 2 in.; average being $2\frac{1}{8}$ in. *A. paphia*, L., captured female $2\frac{1}{8}$ in.; average being $2\frac{7}{8}$ in.

Mr. Barrett exhibited a gynandrous specimen of *Argynnis paphia*, L., taken in the New Forest by Master P. Cardew. This example was singular in having the left fore-wing and about one third of the left hind-wing male, the rest female,

—the division of sex in the hind wing being shown in the colour between two of the nervures, and also in their structure. Mr. Barrett also exhibited the following, lent by Mr. F. Merrifield, of Brighton: Two broods of *Vanessa levana*, L., and *Vanessa c-album*, L., showing seasonal dimorphism produced from the same batch of ova by means of artificial heat and cold; *Vanessa polychloros*, L., darker specimens than any found at large, the result of slow development under a cool temperature; *Vanessa io*, L., showing obliteration of the ocellus in the fore-wing, and increase of the blue spots, artificially produced.

Mr. South exhibited a specimen of *Orthotænia antiquana*, Hb., taken 28th June, 1893, on a shop window in St. John's Wood; also long series of *Pyrausta purpuralis*, L., and *P. ostrinalis*, Hb., which he said he considered might possibly be phytophagous forms of one species, several of the specimens he exhibited being intermediate between the two species. He mentioned that the larva of *P. ostrinalis*, appeared to be undescribed, but that it probably fed on thyme or catmint. A considerable discussion ensued as to the specific distinctness of these two species, Mr. Tutt and others taking the opposite view to that expressed by Mr. South, Mr. Tutt stating that he never knew the two species to be captured together.

Mr. B. W. Adkin exhibited a pair of *Leucania vitellina*, Hb., and a remarkably fine specimen of *L. extrema*, Hb., all taken in the Scilly Isles in September last.

Mr. Auld showed a specimen of *Vanessa atalanta*, L., having the band on one hind-wing, orange, and on the other, red.

Mr. C. A. Briggs exhibited a female *Lycæna bellargus*, Rott. autumn brood, from Folkestone, it being as bright a blue as any male specimen. Mr. Weir remarked that these blue females appear to be found more particularly in some localities than others.

Mr. A. W. Dennis exhibited examples of a partial third brood of *Pararge megæra*, L., the remainder of the brood hybernating as young larvæ.

Mr. Turner showed three very fine specimens of the Scotch form of *Arctia menthastris*, Esp.

Mr. J. M. Adye showed a specimen of *Deilephila livornica*, Esp., captured at Christchurch on the 25th May, 1893.

Mr. McArthur exhibited a second brood of *Boarmia repandata*, L., from the south of Ireland, one specimen being exceedingly dark.

Mr. Jenner Weir exhibited specimens of the Tsetzè, *Glossina morsitans*, West., which he had received from Dr. Percy Rendall, Transvaal, and remarked that these insects, so destructive to cattle in South Africa, looked exceedingly like our innocent house flies. He also exhibited a specimen of a *Depressaria* taken by him more than 30 years ago near Lewes ; it was probably *Depressaria aurantiella*, Tutt, and differed from *D. badiella*, Hb., with which it had been confounded, by possessing large bright orange coloured palpi, as pointed out by Mr. Tutt, those organs in the latter species being dark brown.

Mr. Tutt said that his *Depressaria* was captured at Deal in 1888, and was submitted to Mr. Stainton, who considered it a good species, but thought he had better wait for more material ; but unfortunately he had been unable to capture any more specimens possessing the orange palpi.

Mr. R. Adkin exhibited a series of *Cymatophora* or, Fb., bred from larvæ found feeding between united leaves of aspen in Sutherlandshire, together with representatives of the South English, Shetland, and Rannoch forms for comparison. He called attention to the very grey appearance of the Sutherland series as compared with the English specimens, to the great amount of individual variation in markings of the former, both in regard to the transverse lines, which in some examples were but faintly indicated, and in others so strongly produced as to almost form broad bands across the wing ; and to the stigmata, the reniform and orbicular being both very distinct and united in some specimens, giving the appearance of an irregular white blotch ; while in others neither of them were discernible. Various modifications of these markings connecting these extreme forms, were also pointed out.

Mr. Perks showed examples of the fungus *Agaricus* (*Naucoria*) *semi-orbicularis*, from Wimbledon Common.

Mr. Adkin also exhibited a very large fruit of *Pyrus japonica*.

Mr. Billups exhibited a number of species of rare *Diptera* taken at Oxshott and Dulwich ; among which were *Helomyza apicalis*, Schim., *H. pallida*, Fln., *Ceroxys pictus*, Mg., *Sciomyza dubia*, Mg., *Trixa astroidea*, Dsv., *Sphærophoria taniata*, Mg., *Leptis conspiciua*, Mg. ; also a specimen of the rare *Stenopteryx hirundinis*, L., taken from a deer shot in Sutherlandshire ; and *Bracon scutellaris*, Wesmæl., and *Bracon ostmalii*, Wesmæl., as recorded by him in the "Entomologist," 1893, p. 279.

Mr. Tutt said that he had second broods of *Vanessa io*, L., and *V. atalanta*, L. ; Mr. Barrett remarking that as there

was a large immigration of these species in May last, it was possible that coming from a warmer climate, they had brought with them a tendency to a second brood. A long discussion then took place with regard to Mr. Merrifield's temperature experiments, in which Messrs. Weir, Barrett, Fenn, Tutt, and others took part.

Mr. Oldham exhibited, amongst other species, the following, *Xanthia circellaris*, Hufn., *Hadena chenopodii*, Fb., etc., from Woodford, *Xanthia gilvago*, Esp., *Hadena protea*, Bork., etc., from Norfolk, *Anchocelis lunosa*, Haw., *A. litura*, L., etc., from Cambridgeshire, and several species of Caddis flies from the two latter counties.

OCTOBER 26th, 1893.

J. JENNER WEIR, Esq., F.L.S., *President*, in the Chair.

Mr. Frohawk exhibited examples of a second emergence of *Argynnis paphia*, L., from eggs of var. *valesina*, Esp., only one of the four specimens being of the female parent form. The ova were laid in June, and the larvæ hatched in July. Mr. Tutt remarked that he had bred second broods of *A. paphia* and *Vanessa urticae*.

Mr. South exhibited continental specimens of *Lycæna bellargus*, var. *ceronus*, Esp., females, blue like the male, with the orange spots distinct; *L. corydon*, Fb., with a specimen of the female var. *syngrapha*, Kef., another variety with perfectly white fringe, and several specimens of *L. arion*, L., some of which were very large, and others very dark. Mr. Weir remarked that many years' investigation of the blues at Lewes had resulted in the detection of but little variation.

Mr. S. Stevens showed a specimen of *Tinea simplicella*, H.S.

Mr. Hamm exhibited long series of the two broods of *Leucophasia sinapis*, L., well illustrating both their seasonal and sexual dimorphism; *Colias edusa*, Fb., with several var. *helice*, Hb., among which was a female with only the faintest trace of a spot in the black border; a long series of *Melitæa aurinia*, Rott., bred from Hampshire, with captured specimens from Swansea for comparison; also a remarkable scaleless aberration; it was noted that some of the Hants specimens were comparable to var. *hibernica*, Birch., a specimen of *Polyommatus phlæas*, L., with fewer spots on the primaries than usual; bleached vars. of both *Epinephele ianira*, L., and *E. tithonus*, L., a var. of *Smerinthus tiliæ*, L., a long series of *Toxocampa pastinum*, Tr., a most remarkable var. of *Epinephele hyperanthus*, L., having only

one wing normal; the others with the yellow rings on the under side much enlarged, the colour being irregularly spread over a considerable area, and streaks of it protruding into the black ground; a case containing long and varied series of all the genus *Xanthia*, that of *X. gilvago*, Esp., from Reading, being especially noticeable; some fine *Dasycampa rubiginea*, Fb., and *Cosmia paleacea*, Esp., with many other species.

Mr. Carpenter showed bred series of *Triphæna comes*, Hb., (*orbona*, Fb.), from Aberdeen and of *Aplecta prasina*, Fb., from Essex.

Mr. Enock exhibited a very dark female of the dark April brood of *Lycæna argiolus*, L., taken at Torquay by Master John Enock.

Mr. P. Bright exhibited a gynandrous specimen of *Argynnis paphia*, L., the left side male, the right female; a specimen of *Ematurga atomaria*, L., very dark, with only a few traces of the yellow markings; and another specimen with three normal wings, the right inferior being uniformly dark; a very dark female *Stilbia anomala*, Haw., and a varied series of *Emydia cribrum*, L., some being banded.

Mr. Adkin showed the following types of variation in a series of ten specimens of *Polyommatus phlæas*, L., taken at Eastbourne on September 4th; (1) Showing the submarginal row of black spots on the primaries reduced, in some specimens, to minute dots; (2) Showing spots large, costa and wing rays thickly dusted with black scales; (3) Showing No. 3 of the submarginal series connected with the discoidal spot by a black streak; (4) The spots showing a tendency to elongation; also a long variable series of *Boarmia repandata*, L., bred during August, from south of Ireland ova, among them were examples of both the *conversaria*, Hb., and *destrigaria*, Hb., forms. He remarked that this was only a partial second brood, about half the larvæ being now in hybernation. He considered this remarkable, as his long experience showed this species to be most persistently single brooded, and he had in this case taken no special care to induce the larvæ to feed up.

Mr. McArthur showed very dark specimens of *B. repandata*, bred from the same locality as Mr. Adkin's. Mr. Carpenter remarked that he had attempted to force the larvæ of this species, but without success.

Mr. Billups exhibited a rare species of Sarcophagidæ, *Cynomyia mortuorum*, L., captured at Oxshott in July, 1891.

Mr. Weir exhibited *Heliconius rhea*, Cram., and its mimic

Papilio pausanis, Hew., and remarked that not only the colour of the *Heliconius* but the shape was also closely mimicked, in which latter respect it departed very much from the usual form of the Papilioninæ of South America.

Mr. Frohawk exhibited pupa of *Argynnis adippe*, L., and a discussion ensued relative to the two forms of pupa noticed in each of the genera *Argynnis* and *Vanessa*. He also exhibited a wild raspberry gathered on Tooting Common, and remarks were made on the second crops of strawberries and raspberries occurring this year.

NOVEMBER 9th, 1893.

C. FENN, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. Carpenter exhibited *Boarmia repandata*, L., bred, from the New Forest, about half the brood being the *conversaria* form, but not so striking as the North Devon race; one specimen was intermediate in colour.

Mr. West showed a light var. of *Abraxas grossulariata*, L., taken at Streatham.

Mr. Oldham exhibited light forms of *Agrotis segetum*, Schiff., from Woodford, and dark ones from Norfolk; also a piece of ash bark, channelled by either a *Tomicus* or *Scolytus*.

Mr. Perks exhibited several species of fungi, including *Agaricus ulmarius*, an edible species from St. James's Park.

Mr. Watson reported a partial second brood of *Apatura iris*, L., in the New Forest; he having taken a full-fed larva on October 7th, which pupated, and he was daily expecting the imago to emerge.

Mr. Robert Adkin exhibited series of *Hypsipetes ruberata*, Frr., bred from larvæ received from Sutherlandshire in September, 1892; also *H. sordidata*, Fb., and *Emmelesia minorata*, Fb., taken in Inverness-shire, 1893. Among the *H. ruberata* were some extreme forms, ranging from a pale grey insect with numerous transverse darker grey striæ to a light chocolate brown form with a slightly darker basal fascia, the intermediates including a pale grey ground-colour with chocolate basal fascia; and light greenish-grey ground, with dark brown irregular basal and sub-marginal transverse lines. The *H. sordidata* also showed considerable variation, including forms of a dark mottled brown, with indistinct whitish submarginal line; others with a greenish ground and broad dark brown fasciæ, and various modifications.

Mr. Carrington gave a most interesting account of his

recent experiences during a journey to Manitoba. (*Vide* page 140).

Messrs Fenn, Watson, and others took part in the discussion which ensued, and a hearty vote of thanks to Mr. Carrington was unanimously passed.

NOVEMBER 23rd, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair,

Mr. Carpenter exhibited captured specimens of *Argynnis paphia*, L., from the New Forest, one male and one female, each having a portion of the right primary whitish; also a non-metallic intermediate var. *valesina*.

Mr. Frohawk exhibited specimens of *A. paphia* and var. *valesina*, which had emerged on November 20th and 21st; the pupa had been kept at the ordinary temperature. He also reported having bred *Vanessa atalanta*, L., this month; and that the *Apatura iris* to which Mr. Watson referred at the last meeting, had emerged, but was a cripple. A long discussion ensued regarding the second emergence of some of the Argynnidae. In these instances the metamorphoses, which usually take eight or nine months, were this year completed in as many weeks. The general opinion appeared to be that temperature by itself had very little influence.

Mr. Jenner Weir exhibited *Lycæna trochilus*, which he had received from the South African Republic, where it had been taken by Dr. Percy Rendall; also *Lycæna exilis*, taken by Professor Cockerell at Las Cruces, New Mexico. He stated that these two butterflies were probably the smallest known species of the Rhopalocera, each measuring about 15 mm. in expanse of the primaries. British *L. minima*, Fues., ranged in size from 17 to 22 mm. in expanse of wing. This species was the type of the genus *Zizera*, to which *trochilus* was by some systematists considered to belong also; if such were the case it would be a good illustration of the undesirability of giving to any species a comparative name. Those Entomologists who do not divide into different genera the blue butterflies of the genus *Lycæna* or *Polyommatus* have to describe the two small species in question as smaller than *L. minima*, which is absurd.

Mr. Robt. Adkin exhibited two specimens of *Polyommatus phleas*, L., showing modification of the copper band of the hind wings; and stated that in one this band is represented by five narrow copper streaks on the wing-rays, the remainder of it being obliterated by the black colour; in the other, the

copper colour is visible only on one wing-ray near the anal angle. Both specimens have the row of blue dots that are occasionally present in this species. The undersides of both are normal.

Mr. Perks exhibited a specimen of *Polyporus squamosus* from St. James's Park, weighing 8 lbs. A discussion ensued as to the general paucity of species of fungi this season, although individuals of some kinds were extremely numerous, and many experiences in cooking and eating these interesting morsels were given by various members.

DECEMBER 14th, 1893.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Mr. South exhibited continental specimens of *Argynnis adippe*, L., var. *cleodoxa*, Och., and var. *chlorodippe*, H.S., both from S. Europe; a variety of *Thecla rubi*, L., from Ireland, the upper side of which was unusually dark, while there was no green on the underside, and the white spots were strongly developed; also *Syrichthus malva*, L., var. *taras*, Meig., from Exeter, and stated that it was said to be not uncommon in South Devon.

Mr. Pearce exhibited a long series of *Chrysophanus hypophlæas*, Bd., the American representative of our *C. phlæas*, L.; series of *Colias philodice*, God., with pale var. of the female; *Terias nicippe*, Cram., with yellow form of male; *Pieris rapæ*, L., and various species of *Lycænida*, all from Alleghany Co., U.S.A.; also *Nathalis iole*, Bd., from Colorado. A discussion ensued as to whether *C. hypophlæas* should be considered a species.

Mr. Weir exhibited *Planema euryta*, an Acræine butterfly in which the sexes differed materially in colour and still more in shape, yet in each of these respects it was mimicked by the corresponding sexes of *Pseudacræa apirce* a Nymphaline species belonging to the tribe of Argynnins. All the specimens were from the Cameroons.

Mr. Turner, exhibited a long bred series of *Thera juniperata*, L., arranged to show gradations in the interruption of the band across the fore-wings.

Mr. Billups exhibited *Diastata basilis*, Ron., from Bromley, Kent, and hitherto unrecorded as British; also the following species of Ichneumonidæ, *Ichneumon fuscipes*, bred from larvæ of *Acronycta myricæ* by Mr. Short; *Rhizarcha areolaris*, from the dipterous larvæ of *Phytomyza aquilegia*, by himself; *Colastes dispar*, from larvæ of *Melitæa aurinia*, by

Mr. Frohawk ; *Ichneumon pyrrhopus*, from larvæ of *Eupithecia helveticaria* ; *Glypta bicornis*, from larvæ of *Tortrix palleana* ; *Anomalon cerinops*, from larvæ of *Heliothis dipsacea* ; and *Lissonota sulphurifera*, from the larvæ of *Sesia scoliformis*, all bred by Mr. Adkin. Mr. Billups also exhibited a living specimen of a species of *Gecko* or tree lizard, found in the Boro' Market on a bunch of bananas from the Canary Isles, November 3rd, 1893.

Mr. R. Adkin exhibited a varied series of six specimens of *Tæniocampa gothica*, L., taken at Rannoch in 1893, including var. *gothicina*, H.S., and sundry modifications in the ground colour, one example being unusually pale. Also zanthic varieties of *Zygæna trifolii*, Esp., taken near Emsworth, Hants, by Mr. Christy, in May last.

Mr. Step, specimens of *Planorbis nautilus*, L., taken at Bookham, and stated that he had not previously taken the species in Surrey.

Isochromatous Lepidoptera.

By J. JENNER WEIR, F.L.S., F.Z.S., etc.

Read February 23rd, 1893.

Since November 21st, 1861, when the late Mr. Bates read before the Linnean Society his memorable paper on the "Insect Fauna of the Amazon Valley," in which the theory of mimetic resemblance was first brought to the notice of the scientific world, many entomologists of eminence, notably Mr. Roland Trimen, have shown that protected or non-edible species are closely mimicked by other species, belonging to families or genera which are preyed upon by certain mammalia, birds, and reptiles. It may, indeed, be said that the theory of mimetic resemblances may be considered to be established, and that palatable species are aided in their struggle for existence by resembling those that are unpalatable.

There is another class of facts of a similar character the explanation of which is not so easy, and which formed the subject of discussion between the present writer and the late Mr. Bates. There are both in the old and new world several species of butterflies belonging to the same protected sub-families, or even different sub-families, which resemble each other in both colour and markings in an almost perfect manner. It cannot here be said that the edible insect mimics the inedible, for all are equally unpalatable; nor does it seem possible to say which is the model, and which is the mimic.

Mr. Moore, in his excellent monograph of the *Limnaina* and *Euploeina* (*vide Proc. Zool. Soc.*, 1883), has given tables showing that there are often three, and sometimes even four, species belonging not only to different genera, but to distinct groups of the *Euploeina*, which are more or less isochromatous both in colour and markings; and there are also some instances in which the *Limnaina* have the same resemblance in colour to the *Euploeina*, as true mimics have to their models.

Sometimes, indeed, the resemblance is that of true mimicry, as when the females of the *Euploeine* genus *Trepsichrois* resemble the species of the *Limnaine* genus *Tirumala*, because these females show a complete departure from the more normal coloration of the *Euploeina*; it is, perhaps, needless to add that both the *Limnaina* and *Euploeina* are divisions of the great sub-family commonly known as the *Danainæ*, and are, so far as known, equally inedible.

To illustrate the foregoing observations I have brought for exhibition some specimens of perfectly isochromatous *Euploeine* butterflies, belonging not only to distinct genera, but also to distinct groups:—

Crastia core, *Narmada coreoides*, and *Pademna kollari*, the species exhibited, are as nearly identical in colour and markings as can be conceived, even, in each species, to the duplication of the lowest sub-marginal whitish spot on the upper wings; the first has a faint

androconial patch on the disc of the upper wing; the second has two well-defined androconial patches in the upper wing, forming parallel streaks; and the third has a broad but faint androconial patch on the upper wing, and a large white patch at the basal part of the lower wing.

Mr. Rothney who took *Pademmma kollari* near Calcutta mistook it for *Crastia core*, and I have been obliged to submit the female now exhibited to Mr. Moore, to enable me to quiet my doubts as to which species it really belonged.

These three are all species from continental India; in Ceylon there are three species of the same genera, exactly bearing the same relationship to each other in colour and markings. They are *Crastia asela*, *Narmada montana*, and *Pademmma sinhala*; almost the only difference between these three insular and the three Indian species is that the former have less spots than the latter on the upper wing, and the white throughout all the wings is much duller, being, indeed, of a pale brownish white.

I exhibit the two first-mentioned species, but I have not been able to obtain *Pademmma sinhala*.

The only explanation of this remarkable isochromatism existing between equally inedible species is that of the late Fritz Müller. He was of opinion that young animals had to learn by experience the insects which were palatable and unpalatable, and that, where several unpalatable species closely resembled each other in colour and pattern, that experience might be obtained by tasting one only of the nauseous species, and for the future avoiding that and the others resembling it; a clear advantage. Shortly, this is how I understand his argument. His view has been accepted by Dr. Russel Wallace and others.

My experience was not quite in accordance with Fritz Müller's view, for I always found that when I gave my aviary of birds nauseous larvæ, they took not the least notice of them; many of these larvæ belonged to species that the birds, from their age, could never have seen before, and therefore could have had no experience of their inedibility.

I was of opinion then, and am still, that birds have an hereditary instinctive knowledge of the relative edibility of insects; but, in common with many other rules, to this there may be exceptions, and others have made observations showing that birds do sometimes taste nauseous insects. Of course, there might have been a time in the remote history of birds when they were obtaining and perfecting this hereditary instinct, the isochromatous colouring might have then been a great advantage.

Mimicry and isochromatism exist far more in tropical and sub-tropical countries than in temperate regions, and as in the former it appears that the struggle for existence is more severe, I feel inclined to accept, though with some hesitation, Fritz Müller's theory as, at any rate, a working hypothesis.

Notes on the Fauna and Flora of Horsley, as observed
by the Members on the occasion of the Society's
Field Meeting on May 13th, 1893.

Compiled by HY. J. TURNER, F.E.S. Read May 25th, 1893.

The Members assembled at Waterloo about 2 o'clock as the Committee had arranged, and after an hour's pleasant ride, mainly through a fine collecting district, we arrived at our destination.

The first capture was *Euchloë cardamines*, L., on the roadside near the inn; and quickly nets were swinging in all directions, for *Emmelesia aibulata*, Schiff., was crossing the road in numbers. We entered the field to the right, and were soon busy with the pretty but swift flying *Heliaca tenebrata*, Scop. (*arbuti*, Fb.). Here were more *E. cardamines* with *Pieris napi*, L.; *Syrichthus malvæ*, L. and *Nasionades tages*, L., somewhat worn; *Polyommatus phlæas*, L., *Lycæna icarus*, Rott., and *Cænonympha pamphilus*, L., freshly emerged; *Euclidia mi*, Clerck., *E. glyphica*, L., and *Pyrausta purpuralis*, L., in their usually damaged state; and of course the two pests *Crambus hortuellus*, Hb., and *C. pratellus*, L., were well in evidence. Adjoining these fields was a shady pond, which produced, among other treasures, several species of *Agabus* to our only Coleopterist.

Proceeding along the edge of the wood many geometers were driven out; *Lomaspilis marginata*, L., *Cabera pusaria*, L., *Acidalia remutaria*, Hb., and *Asthenia candidata*, Schiff., in good condition; one or two *Bapta temerata*, Hb., and a single *Zonosoma annulata*, Schulz. (*omicronaria*, Hb.) were captured. The larvæ of *Cleora lichenaria*, Hufn., was searched for, but failed to put in an appearance. Almost every bush of spindle was swarming with the larvæ of *Hyponomeuta evonymella*, L. A short lane produced *Saperda populnea* and the lovely nest of a wood warbler (*Phylloscopus sibilatrix*, Bech.) with seven eggs. Close by, among some young birch and under-wood, *Euchelia jacobææ*, L., was in full force, and an odd *Pararge megæra*, L., was noted with *Melanippe montanata*, Bork. Here, too, our botanists got rewarded, for spikes of *Orchis mascula*, L., were found with *O. maculata*, L., not yet in flower. Wandering on through the fields, the beautiful larvæ of *Diloba cæruleocephala*, L., were seen defoliating the sloe; and *E. albulata*, Schiff., was in swarms flying over the grass in the field next the Guildford Road. Geometer larvæ, including the beautiful *Hybernia defoliaria*, L., seemed plentiful wherever any beating was done. Crossing the road by the church we took the path leading to the sheep leas. Under the beech trees on the right were many spikes of *Cephalanthera grandiflora*, Bab., with a few *Listera ovata*, Br. There was also *Daphne laureola*, L. When the open leas were reached, there were the blues, *L. astrache*, Bgstr., and *L. icarus*, Rott., with *C. pamphilus*

in large numbers gradually seeking rest, as the sun went down, on tall stems of grass and other elevated coigns of vantage. On our return these were all quiet, and vars. were eagerly sought, but success was nil. At the top of the leas more than two dozen were counted on one dead flower spike of burdock. A plant of deadly nightshade (*Atropa belladonna*, L.), which on a former visit of the Society was more than seven feet high, was again rearing its head, and on an old stump near the allied *Solanum nigrum*, L., was growing. All the burdock leaves around this part were well riddled by the larvæ of *Aciptilia gatactodactylus*, Hb., and a few late ones were found by the searchers.

Now we dispersed, and when afterwards comparing notes several additional species were added to our list, including one *Epione advenaria*, Hb., and one *Bapta bimaculata*, Fb. (*taminata*, Hb.); *Bupalus piniaria*, L., *Cidaria associata*, Bork., *Phytometra viridaria*, Clerck. (*ænea*, Hb.), *Iodis lactearia*, L., *Ematurga atomaria*, L., and *Strenia elathrata*, L., were recorded; *Anaitis plagiata*, L., and *Botys hyalinialis*, Hb., were just emerging; specimens were also taken of *Botys fuscalis*, Schiff., *Xanthosetia hamana*, L., *Cidaria corylata*, Thnb., and *Melanippe rivata*, Hb. Our micro-lepidopterists among other things noted the cases of *Psyche hirsutella*, Hb. (*fusca*, Sta.), and imagines of *Carpocapsa grossana*, Haw., *Eupœcilia ciliella*, Hb., *Glyphipteryx fuscoviridella*, Haw., and *Elachista argentella*, Clerck. (*cygnipennella*, Hb.). Our return over a portion of the same ground was most productive in specimens, but only *Phalera bucephala*, L., and *Zonosoma linearia*, Hb. (*trilinearia*, Bork.) were new.

The inner man now needed attention; and although the accommodation was but meagre, ample justice was done to what was put before us. The walk to the station, after passing through the quaint village, produced a specimen of *Melanthia ocellata*, L., and two of our number who had gone to the rhododendrons reported that, to their disgust, all were burnt, together with much of the surrounding forest. A specimen of *Lycæna bellargus*, Rott., had, however, been taken. The time occupied in our journey home was most pleasantly spent in relating experiences, etc., and all returned to town thoroughly pleased with the Meeting.

Notes on the Fauna of Oxshott, as observed by the
Members on the occasion of the Society's Field
Meeting on June 10th, 1893.

Compiled by H. J. TURNER, F.E.S. Read June 22nd, 1893.

The railway is very convenient at this spot, for it lands one right on the collecting ground. Turning to the left on leaving the station the members quickly dispersed, and among the scattered fir and birch trees, *Eubolia plumbaria*, Fb., was noted in fine condition; *Epinephela janira*, L., *E. lithonus*, L., *Cænonympha pamphilus*, L., *Syrichthus malvæ*, L., and one or two *Lycena ægon*, Schiff., represented the Rhopalocera; from the heather *Ematurga atomaria*, L., which has been about so long this year, a few *Aspillates strigillaria*, Hb., and an odd specimen of *Nemeophila russula*, L., were disturbed; while the wooded portion yielded *Cabera pusaria*, L., *Acidalia remutaria*, Hb., *Asthenia candidata*, Schiff., *Camptogramma bilineata*, L., and *Lomaspilis marginata*, L. In this part of the heath the sundew (*Drosera rotundifolia*, L.) flourished, and many patches of the parasitical dodder (*Cuscuta epithymum*, Murr.) were seen. On entering the fir woods proper, going north, members were astonished at the vast numbers of *Bupalus piniaria*, L., and *Thera variata*, Schiff., which the beating stick produced, many of the former being in fine condition. On the trunks *Scoparia dubitalis*, Hb., and *S. truncicolella*, Sta. were present; one *Ellopiæ prosapiaria*, L., a few *Macaria liturata*, Clerck., in fine condition, and plenty of *Eupithecia indigata*, Hb., almost unrecognizable. *Iodis lactearia*, L., was flying, and *Retinia pinivorana*, Zell., was reported. Specimens of the coleopterous family Coccinellidæ were observed in all four stages, pupæ of *Coccinella ocellata*, L., being especially noticeable for their curious habit of suddenly standing at right angles to the trunk of the tree when disturbed.

At length we reached a hedge of variable growth bordering the fir wood, and here *Aplecta nebulosa*, Hufn., and *Melanthia albicillata*, L., were taken from the trees, while full-fed larvæ of *Panolis pini-perda*, Panz., were beaten, and *Melanippe montanata*, Bork., *M. sociata*, Bork., *Larentia viridaria*, Fb., and *Ebulea sambucalis*, Schiff., were driven out, while *Tortrix viridana*, L., was certainly there. Turning sharp to the left, we reached a damp situation where the bog myrtle (*Myrica gale*, L.), so attractive to Lycenidæ, grows, together with the marsh violet (*Viola palustris*, L.) and the pennywort (*Hydrocotyle vulgaris*, L.) Here was obtained *Cataclysta lemnata*, L., and *Hydrocampa nympheata*, L., with a solitary specimen of *Leucania impura*, Hb. Under the shelter of the spreading fir trees near, were several nightjars (*Caprimulgus europæus*, L.), whose eggs were unsuccessfully searched for. Now a beautiful piece of undergrowth was reached, which with the adjoining palings

produced considerable numbers both of species and specimens. *Melanthia ocellata*, L., *Phorodesma pustulata*, Hufn., *Tephrosia punctularia*, Hb., among the Geometers, and *Triphaena pronuba*, L., *Noctua c-nigrum*, L., *Agrotis exclamationis*, L., *Cloantha monoglypha*, Hufn., among the Noctua, were added to our list. A solitary specimen of *Drepana cultraria*, Fb., was taken, and among the micros *Pedisca bilunana*, Haw., *P. corticana*, Hb., *Eupæcilia nana*, Haw., and *Elachista argentella*, Clerck. Many species found before were present here again, including a number of fine specimens of *Melanthia albicillata*, L.

The road was now reached, and the party turned for tea. The walk produced *Coremia designata*, Hufn., on trunks, a single *Eupisteria obliterated*, Hufn., from stunted alders, and a nest of *Bombyx neustria*, L., strange to say, feeding on birch. After a hearty tea at the porter's cottage, we rambled over the heath, taking abundance of *Pempelia palumbella*, Fb., with *Eupithecia nanata*, Hb., sparingly, and one or two *Hadena porphyrea*, Esp.; *Acidalia subsericeata*, Haw., was taken in some numbers just at dusk. The nests of a willow warbler (*Phylloscopus trochilus*, L.), with five eggs, and of a meadow pipit (*Anthus pratensis*, L.), with three eggs, were found. A snake (*Natrix torquata*, Ray.) had been seen by some members, and the lizard (*Lacerta vivipara*) was exceeding common in sunny spots. Many thanks are due to Mr. Lewcock, who lost the train, and did not join the party till the return journey, for the following notes on the Coleoptera:

"I started to meet the 2.17 train, but just missed it by two minutes. Under the circumstances I decided to take the next train to Surbiton, and walk round by the fields through Claygate to Oxshott, and collect by the way. I arrived at Surbiton at 3.15, and turned to the left, coming out of the station, making for the foot-path which skirts the railway bank, and eventually turned into Claygate Lane. Having on one occasion seen a specimen of *Megapenthes lunicollis* taken almost under my nose, in this lane, I began working for it, but without success. However, I found a single *Mordellistena humeralis* sitting on Hieracleum flowers; and I may here record that I also obtained one on June 20th, 1891, at the Eynesford excursion. In other Umbelliferae I found several *Grammoptera tabacicolor*, a species common to this locality. In elder blossom, one *Quedius cruentus*—which occurs sometimes under bark, but only singly. Also several *Anthocomus fasciatus*—a pretty little red and black Malacoderm, which is frequently found during June at Claygate. By using the sweeping net among the meadow plants, several *Ceuthorrhynchus campestris* and *Prasocuris aucta* turned up, with a few *Ceuthorrhynchus cochleariae*, *Gymnetron pasuorum*, and several species of *Apion*. All these are common to the locality.

"Of course, one meets with many species over and over again by working at one place, and it would be quite useless to record all the

species found here; for instance, I met with ten species of *Telephorus*, and with the exception of *T. fuscicornis* and *T. discoideus*, all are common. It may be worthy of remark that at Eynesford, in 1891, *T. fuscicornis* was the commonest of the group in that district. Another very common beetle on birch, hornbeam, and a variety of things at Claygate, is *Luperus betulinus*, and common enough it was on Saturday, falling literally in hundreds into the umbrella.

"The Black Pond was reached soon after 7 o'clock, but nearly all the *Donaciæ* had retired for the day, so that only *D. sericea*, with the intermediate forms to *D. comari*, were to be obtained. Two or three *Coccinella ocellata* were found on the reeds, and one or two *Eirirrhinus nereis*. The final capture was a nice specimen of *Cryptocephalus lineola*, making the third captured at this spot by myself. A great many odd and common things put in an appearance, such as *Adimonia caprea*, *Strophosomus limbatus*, but these captures are all decidedly uninteresting. I joined the party at Oxshott Station for return journey at 9.27."

So ended another very successful and pleasant field meeting of this Society.

Notes on the Unusual Abundance of *Polyommatus phlæas*, L., in 1893.

By F. W. HAWES. Read September 28th, 1893.

About ten years ago there appeared in a volume of the "Entomologist" a note calling attention to the then scarcity of the small copper *P. phlæas*, L., in these Islands, the writer giving it as his opinion that this little species is, or was, following in the wake of its larger relative *P. dispar*, Haw., and gradually becoming extinct so far as concerns Great Britain. Happily since that time *P. phlæus* has steadily gained ground, culminating during this season in an abundance at the present date which may well be termed extraordinary. The first brood, together with many other species, appeared abnormally early, being well out at the beginning of May (the first specimens having been seen in April commonly), and speaking for my own neighbourhood, where the species is always present in varying quantity year by year, the second brood was on the wing about July 10th, or fully three weeks before the usual time. This brood, which is the most regular as to time and numbers, scarcely ever fails to put in an appearance during the first week in August: but this year by that time many of the resulting larvæ were full-grown; and the third brood began to emerge during the last week in August, and was well out early in September. In fact, except for a slight lull at the beginning of August, specimens were to be seen

throughout the day visiting the flowers in gardens, fighting in pairs in the streets, often being carried away on the wind, but chiefly congregating in favoured rough corners and lanes, and the banks of the railway, where the early morning sun seems especially to have drawn them out into full flight before 9 a.m.

Such a numerical increase in these two emergences suggested the probability of a corresponding increase in the progeny of the third brood, but I was not at all prepared for what I actually saw on September 23rd. A grassy lane between pasture-land which is dry and open, besides many species of grasses, is rich in *Lotus*, *Galium*, *Cardamine*, etc., etc., and especially fertile in species of *Rumex*, common sorrel (*Rumex acetosa*) growing in quantity. Here, during this month (September), *P. phlæas* has revelled. The first root inspected showed about a dozen of the ova placed anywhere on the leaf, both upper and under sides, and even along the stalks where exposed. Succeeding clumps were equally patronized, and in some cases individual leaves of the plant were literally besieged with eggs, as when a withered leaf on a long stalk projecting on to the footpath, was found to have twenty-one eggs and four young larvæ attached to it. Altogether, in an hour I selected more than 100 of the ova, and left at least twice as many for future observation of the larva. I should at once mention that this abundance was, in a manner of speaking, quite local. One side of the grassy lane faces the south east and catches the early morning sun; there is no ditch, and the sorrel and dock grow quite commonly under a hedge in a dry gravelly soil. Although dock was equally plentiful with sorrel, the latter plant was always preferred, indeed, on only one clump of dock did I find ova and larvæ, and then on a young and stiff-leaved plant. The luxurious growths of common dock were entirely neglected, as also were both species of *Rumex* when growing amongst the turf, or in a damp ditch running the length of the opposite side of the lane. This latter fact points decisively to the cause of variation in numbers, and it is quite clear that this summer the same conditions have acted with exactly opposite effects on species like *Pieris napi* and *P. phlæas*—with the former entirely delaying a second brood except in the dampest districts; with the latter, *P. phlæas*, enormously increasing, and palpably accelerating the emergence of two successive broods. A wet autumn and winter will doubtless thin down the present abundance to a normal spring emergence in 1894; while a dry spell in January, February, and March, will do much to preserve an exceptional quantity of the larvæ, and produce a large brood during next May and June. It may even happen that, provided October of this year be reasonably warm, a partial fourth brood will put in an appearance at the end of that month; and thus in 1893 four broods will have appeared in the period ordinarily taken to produce three. I took a good female last year on October 31st, after several nights of frost.

As regards the larva, I may mention, that so far I have not found it in a state of nature feeding on the upper side of the leaf; it appears, like *Nemeobius lucina*, L., on *Primula*, to attach itself to the underside, *i.e.*, on the side least exposed to the light and its feathered enemies, where it eats out small portions and rests in the cavities so made, from time to time wandering to the other parts of the same leaf during the first week or so of its existence. At this early stage it is exceedingly difficult to detect with anything like certainty, and the best plan is to gather the riddled leaves with the eggs and egg-shells, and keep them in a dry situation well surrounded with fresh leaves of the food-plant. The larvæ when large, present varying forms; which may be roughly divided into those that are grass green merely, and those that have besides dorsal and spiracular pink stripes; these latter are very handsome, and produce a larger proportion of the male insect, though not exclusively confined to that sex. The species is amenable to the forcing treatment, and larvæ full-fed during October, may be brought to the perfect state in November. Careful management will produce fine and large specimens.

Notes and Observations during a Journey to Manitoba in 1893.

By J. T. CARRINGTON, F.L.S. Read November 9th, 1893.

On the day after leaving Merville, N. Ireland, where butterflies were fairly common, a *Vanessa urticae* appeared, and was seen every day of the sunny outward voyage till the day before reaching land; while on the return voyage several species of Lepidoptera were noted, having, no doubt, taken shelter in the bundles of hay which formed part of the cargo. A similar instance of emigration came under my notice on a previous occasion, when I observed *Agrotis cinerea* perfectly stationary on a stanchion during the whole time I was going from Dover to Ostend.

From Quebec to the west much of the vegetation seemed of the familiar European type, and perhaps the most striking of the commonest weeds up to the forest region was the chicory (*Cichorium intybus*), many spots being blue with its flowers. The ox-eye daisy (*Chrysanthemum leucanthemum*) was common in the fields, but especially so along the small bank of rubbish thrown out from the railway ditches. It was, however, absent in the forest region except by the railway, along which it had crept year by year to the distance of about 200 miles. A few years ago it was only on the confines, but seemed to be going west very rapidly.

The forest region consisted of fir-trees, heather, bilberries, there

called "blueberries," and a bracken much more soft and velvety than our common English species. The trees were small, the frequency of forest fires, which often ranged for twenty miles, effectually prevented the growth of large timber. By moonlight, the unbroken aspect of white trunks in the devastated districts, aided by the death-like silence, rendered the scene especially weird and uncanny.

As collecting ground I consider the railway banks most favourable, for there the vegetation was particularly rich. I observed eight or nine species of the genus *Argynnis* alone; while Neuroptera were abundant on the huge heads of the umbelliferous plants. An occasional *Vanessa antiopa* was seen, but the species was very local.

The rate of travelling by rail was slow, and the stoppages frequent and long, so that ample opportunity was afforded to anyone collecting, more especially as the profuse vegetation almost touched the train. A few insects boarded the train, and among them a *Papilio*, which in one place was common.

Only a few individuals of a species of rook were seen, on the dead stumps, otherwise there seemed a total absence of bird life; while the abundance of insects would seem to imply at any rate the absence of insectivorous birds. Fur-bearing animals were said to be in quantities, but never to approach the rail except in hard weather.

The lake region was exceptionally beautiful; but no waterfowl were noticed, and it was said that none were there but during migration. Fish were in large numbers, and it was the custom of the townspeople to form fish encampments at some part of the year. The Indians, too, had their encampments for fishing, at which they are adepts. A species called the white fish is the favourite capture.

The scenery near the head of Lake Superior was wild and grand, and the engineering must have been exceedingly difficult. Yet during the whole way from Quebec to Winnipeg only about four tunnels were made.

After crossing the ocean the prairie seemed to strike one as a consolidated sea. It was absolutely flat. Birds were common, and life more general than in the forest region; while the death-like silence no longer existed. The species of butterflies seemed fewer, but the Neuroptera and Orthoptera were everywhere, some species being extraordinarily abundant.

Although the climate was very hot, often 95° in the shade, yet little fatigue was felt, the air being extremely dry. On one occasion a journey of 84 miles on horseback was made without apparent inconvenience to horse or rider. Perspiration was never any discomfort. In winter the cold was very intense, reaching sometimes 22° below zero; nevertheless it was very exhilarating, providing proper care were taken to prevent frost-bite. A species of Diptera, apparently a *Culex*, was a most intolerable nuisance, the female attacking in swarms and causing the neck, wrists, and ankles to bleed profusely,

the latter being especially liable to their attacks in walking through the long grass, where they abounded.

The flora of the prairie was not nearly so varied as in mountain regions, owing to the periodical fires caused by lightning ; all species, whether of plants or insects, thus had a very hard struggle for existence. On one occasion I noticed a prairie hen and chickens which were exceedingly tame, no doubt trusting to the long and thick grass which was everywhere. In fact it was found impossible to successfully grow any introduced species of grass more than the second year, the struggle with the native species being so severe. The hay from the native grass was very good, so that it was not really necessary to introduce new kinds.

During a long drive I was much deceived by a mirage, and was told that it was a very common occurrence, and by the people not considered worthy of remark. On one occasion the sunlight was obscured by a very dark cloud, and streams of lightning appeared so incessantly as to render it possible to read, but it was unaccompanied by thunder.

At Montreal I saw the collection of a gentlemen, who said that entomologists in Canada ignored political boundaries, and took physical areas as a rule. Most people were engaged in money-making, and consequently naturalists were few and far between.

LIST OF MEMBERS

Chief subjects of Study:—*h*, Hymenoptera; *o*, Orthoptera; *he*, Hemiptera; *n*, Neuroptera; *c*, Coleoptera; *d*, Diptera; *l*, Lepidoptera; *orn*, Ornithology; *r*, Reptilia; *m*, Mollusca; *cr*, Crustacea; *b*, Botany; *mi*, Microscopy; *e*, signifies Exotic forms.

YEAR OF ELECTION.

- 1886 ADKIN, B. W., Brandon House, Morden Hill, Lewisham, S.E.
l, orn.
- 1882 ADKIN, R., F.E.S., *Hon. Treasurer*, Wellfield, 4, Lingard's Road, Lewisham, S.E. *l.*
- 1886 ADYE, J. M., F.E.S., Somerford Grange, Christchurch, Hants. *l.*
- 1891 ANDERSON, R. J., Suez.
- 1888 ATMORE, E. A., F.E.S., 48, High Street, King's Lynn, Norfolk. *l.*
- 1888 AULD, H. A., 31, Belmont Hill, Lee, S.E. *l.*
- 1887 BARCLAY, F. H., F.E.S., Leyton, Essex. *l, orn, palæontology.*
- 1884 BARKER, H. W., F.E.S., 147, Gordon Road, Peckham, S.E. *l.*
- 1887 BARREN, H. E., 46, Lyndhurst Road, Peckham, S.E. *l.*
- 1889 BARRETT, C. G., F.E.S., *Vice-President*, 39, Linden Grove, Nunhead, S.E. *l, m.*
- 1889 BEAUMONT, A., F.E.S., The Red Cottage, Pond Road, Blackheath, S.E. *l, c, orn.*
- 1888 BENNETT, W. H., 11, George Street, Hastings. *h, c.*
- 1893 BILLINGHURST, H., 35, Granville Park, Lewisham, S.E. *l.*
- 1888 BILLUPS, P. C. C., M.D., 24, Shepherd Street, New Swindon.
mi.
- 1877 BILLUPS, T. R., F.E.S., 20, Swiss Villas, Coplestone Road, Peckham, S.E. *h, o, c, d, he.*
- 1891 BIRD, G., The Manor House, West Wickham, near Beckenham, Kent.
- 1892 BLACHFORD, J. V., M.B., M.R.C.S., Lambeth Infirmary, S.E.
- 1893 BOND-SMITH, W., Potton, near Sandy, Beds. *l.*
- 1873 BOLGER, H. L. *l.*

YEAR OF
ELECTION.

- 1887 BRIGGS, C. A., F.E.S., Surrey House, Leatherhead, Surrey.
l, m, n, o, British fishes.
- 1887 BRIGGS, T. H., M.A., F.E.S., Surrey House, Leatherhead. *l.*
- 1891 BRIGGS, H. MEAD, 17, St. George's Place, Canterbury, Kent. *l.*
- 1890 BRIGHT, P., Roccabrunna, Bournemouth. *l.*
- 1890 BRISTOWE, B. A., F.E.S., Durlstone, Champion Hill, S.E. *l.*
- 1893 BRISTOWE, L. W., Durlstone, Champion Hill, S.E. *l.*
- 1890 BROWN, E. W., Capt., 2nd Battalion, Royal West Kent
Regiment, Enniskillen, Ireland. *l.*
- 1890 BRYANT, G., F.E.S., Somerset Lodge, Old Shirley, South-
ampton. *l.*
- 1890 BUTLER, W. E., Hayling House, Oxford Road, Reading. *l.*
- 1888 CANSDALE, W. D., F.E.S., Sunny Bank, South Norwood, S.E. *l.*
- 1889 CANT, A., F.E.S., 10, Chandos Street, Cavendish Square, W. *l.*
- 1886 CARPENTER, J. H., Johnson Villa, Gleneagle Road, Streatham,
S.W. *l.*
- 1877 CARRINGTON, J. T., F.L.S., 1, Northumberland Avenue, W.C.
l, cr.
- 1872 CHAMPION, G. C., F.Z.S., F.E.S., 11, Caldervale Road, Elm
Park, Clapham, S.W. *c.*
- 1872 CHANEY, W. C., 32, Stroud Road, Woodside, S. Norwood,
S.E. (*Hon. member*). *h, l, c.*
- 1888 CHITTENDEN, D., Wellesboro' Lees, Ashford, Kent. *l.*
- 1887 CLARK, J. A., F.E.S., The Broadway, London Fields, E. *l.*
- 1890 CLARK, R. A., M.A., Rossall School, Fleetwood, Lancaster. *l.*
- 1888 CLARKE, A. L. *l, b.*
- 1879 CLODE, W. (*Life member*).
- 1886 COCKERELL, T. D. A., F.Z.S., F.E.S., Las Cruces, New Mexico,
U.S.A. *h, d, m.*
- 1884 COOK, A. E., 31, Lower Road, Rotherhithe, S.E. *l, orn, r.*
- 1884 COOPER, J. A., Sussex Villas, Harrow Road, Leytonstone
Road, E. *l, orn.*
- 1885 CROKER, A. J., F.E.S., 16, Campbell Road, High Street,
Walthamstow. *l. c.*
- 1891 DACIE, J. C., Mayfield, 105, Upper Richmond Road, Putney,
S.W. *m, l.*
- 1886 DAY, G., F.R.M.S., 11, Chesterton Road, North Kensington,
W. *orn, mi.*
- 1888 DAWSON, W. G., Plumstead Common, Plumstead, Kent (*Life
member*). *l.*

YEAR OF
ELECTION.

- 1889 DENNIS, A. W., 48, Mansfield Street, Kingsland Road, E. *l*.
 1890 DENNIS, G. C., F.E.S., 39, Blossom Street, York. *l*.
 1891 DEWEY, A. E., 35, Moore Park Road, Walham Green, S.W.
 1890 DOBRÉE-FOX, Rev. E. C., Castle Moreton Vicarage, Tewkesbury. *l*.
 1884 DOBSON, H. T., Douglas Villa, Acacia Road, New Malden, Surrey. *l, orn*.
 1884 DOWNING, J. W., F.E.S., 59, Lupus Street, Pimlico, S.W. *l*.
 1886 DUNNING, J. W., M.A., F.L.S., F.Z.S., F.E.S., 4, Talbot Square, W. (*Hon. member*).
 1886 EDWARDS, S., F.L.S., F.Z.S., F.E.S., *Hon. Sec.*, Kidbrook Lodge, Blackheath, S.E. *l, e l*.
 1877 ELISHA, G., F.E.S., 122, Shepherdess Walk, City Road, N. *l*.
 1886 ENOCK, F., F.E.S., 21, Manor Gardens, Upper Holloway, N. *d, mi*.
 1889 FARRANT, M., 74, Cambridge Street, Pimlico, S.W. *l*.
 1887 FARREN, W., F.E.S., 14, King's Parade, Cambridge. *l*.
 1894 FELL, FRANCIS, 21, Whitehall Road, Anerley, S.E. *l*.
 1888 FENN, C., F.E.S., Eversden House, 83, Burnt Ash Hill, S.E. *l*.
 1888 FENTON, F. E., F.R.C.S., M.R.C.P., F.I.Inst., Langstone, Ealing, W.
 1872 FICKLIN, A., Norbiton, Surrey. *l*.
 1891 FILER, F. E., 58, Southwark Bridge Road, S.E. *l*.
 1887 FITCH, E. A., F.L.S., F.E.S., Brick House, Maldon, Essex. *l, c, hy*.
 1887 FLETCHER, W. H. B., M.A., F.E.S., Fairlawn House, Worthing, Sussex (*Life member*). *l*.
 1889 FORD, A., Glen Mount, 107, Braybroke Road, Hastings. *l, c*.
 1891 FORRESTER, A. C., 99, Endlesham Road, Balham, S.W. *l*.
 1889 FORTUNE, R., Ravensgill, Franklin Mount, Harrogate. *orn*.
 1887 FOWLER, The Rev. Canon, M.A., F.L.S., F.E.S., The School House, Lincoln. *c*.
 1886 FREMLIN, H. S., M.R.C.S., L.R.C.P., F.E.S., Mereworth, near Maidstone, Kent. *l*.
 1886 FROHAWK, F. W., F.E.S., 39, Dornton Road, Balham, S.W. *l. orn, r, gen, zoo*.
 1889 GERRARD, V., 69, Dunsmure Road, Stamford Hill, N. *l*.
 1884 GIBB L., 148, St. James Street, Montreal, Canada. *l*.

YEAR OF
ELECTION.

- 1885 GOLDTHWAITE, O. C., F.E.S., Meadow Side, Edinburgh Road,
Carshalton, Surrey. *l*.
- 1889 GREENE, Rev. J. G., M.A., F.E.S., Rostrevor, Apsley Road
Clifton, Bristol. *l*.
- 1893 HALL, A., 16, Park Hill Rise, East Croydon, Surrey.
- 1888 HALL, A. E., F.E.S., Norbury, Sheffield. *l*.
- 1884 HALL, T. W., F.E.S., *Vice-President*, Stanhope, The Crescent,
Croydon, Surrey. *l*.
- 1891 HAMM, A. H., 24, Hatherley Road, Reading. *l*.
- 1892 HARRISON, A., F.C.S., Thames Sugar Refinery, Silvertown, E.
- 1887 HAYWARD, H., 53, Fenwick Road, Peckham, S.E.
- 1884 HELPS, J. A., Newstead Lodge, 91, Wood Vale, Forest Hill,
S.E. *l*.
- 1886 HENDERSON, J., 24, Birchin Lane, E.C. *l, orn*.
- 1878 HICKLING, G. H., Landon Cottage, Elm Road, Sidcup. *l*.
- 1890 HILL, H. A., F.E.S., 132, Haverstock Hill, Hampstead, N. *l*.
- 1888 HILLMAN, T. S., F.E.S., Eastgate Street, Lewes, Sussex. *l*.
- 1889 HINCHLIFF, Miss K. M., Worlington House, Instow, N. Devon.
l, e l.
- 1890 HODGES, A. J., 2, Highbury Place, Islington, N. *l*.
- 1888 HOPKINS, H. E., 153, Camden Grove North, Peckham, S.E. *l*.
- 1889 HORNE, A., 52, Irvine Place, Aberdeen. *l*.
- 1889 HOWGRAVE, W., 56, Granville Park, Lewisham, S.E. *l*.
- 1886 JÄGER, J., 180, Kensington Park Road, Notting Hill, W. *l*.
- 1887 JENNER, J. H. A., F.E.S., 4, East Street, Lewes, Sussex. *l, c,*
d, m, b.
- 1884 JOBSON, H., 1, Rock Villas, Maynard Road, Walthamstow, E. *l*.
- 1894 JONES, Rev. W. CORDEN, Wroxall House, 162, Barry Road,
East Dulwich, S.E.
- 1886 KANE, W. F. DE V., M.A., F.E.S., M.R.I.A., Drumreaskie
House, nr. Monaghan, Ireland. *l, mi, marine invertebrata*.
- 1887 KEAYS, A. M., A.S.T.E., M.S.A., Wandle Cottage, Croft Road,
Sutton, Surrey.
- 1887 KEDGLEY, C., Hibernia Chambers, Borough, S.E.
- 1887 KELSALL, Rev. J. E., East Boldre Vicarage, nr. Southampton.
orn, r.
- 1884 KENWARD, J., Rosslyn, New Eltham, Kent. *l*.
- 1888 KNIGHT, E., 1, Phoenix Villas, Devonshire Road, Merton, S.W.
- 1892 LARKIN, J. W., 48, Buckleigh Road, Streatham Common, S.W.

YEAR OF
ELECTION.

- 1894 LAWRENCE, H. B., 1, Derwent Road, Anerley, S.E. *l*.
- 1887 LEECH, J. H., B.A., F.L.S., F.Z.S., F.E.S., F.R.G.S., 29, Hyde Park Gate, S.W. *macro-l, etc., of Wallace's palæarctic region.*
- 1889 LEGROS, A. V., 57, Brook Green, Hammersmith, S.W.
- 1889 LEMMON, C. H., 129, Hawkstone Road, Rotherhithe, S.E.
- 1884 LEVETT, C., 107, Brockley Road, S.E. *l*.
- 1872 LUBBOCK, The Right Hon. Sir JOHN, Bart., M.P., D.C.L., F.R.S., F.L.S., F.G.S., F.E.S., etc., High Elms, Down, near Farnboro', Kent (*Hon. member*). *h, b.*
- 1890 MCARTHUR, H., 35, Averill Street, Fulham, W. *l*.
- 1872 M'LACHLAN, R., F.R.S., F.L.S., F.Z.S., F.E.S., Westview, Clarendon Road, Lewisham, S.E. (*Hon. member*). *n.*
- 1889 M'LACHLAN, W. H., 70, Croxted Road, West Dulwich, S.E. *l*.
- 1892 MAIN, H., Thames Bank House, East Greenwich, S.E. *l*.
- 1886 MANGER, W., F.E.S., 100, Manor Road, New Cross, S.E. *l, c.*
- 1889 MANSBRIDGE, W., F.E.S., 21, Rosenau Crescent, Battersea Park, S.W.
- 1888 MARSHALL, A., The Caxtons, Knebworth, Herts. *l*.
- 1885 MERA, A. W., 1, Lothian Villas, Capel Road, Forest Gate, E. *l*.
- 1881 MILES, W. H., F.E.S., The New Club, Calcutta, India. *mi, b.*
- 1888 MITCHELL, A. T., 5, Clayton Terrace, Gunnersbury, W.
- 1888 MONTAGUE, C. J., Temple Chambers, Falcon Court, Fleet Street, E.C.
- 1880 MONTIERO, Senor A: DE C., F.E.S., Rua do Alacrine, Lisbon.
- 1889 MOORE, H., 12, Lower Road, Rotherhithe, S.E. *l, h, d, e l, e h, e d, mi.*
- 1887 MORRIS, C. H., School Hill, Lewes, Sussex. *l, c, m.*
- 1887 NEVINSON, E. B., 7, Staple Inn, W.C. *l, stalk-eyed crustacea.*
- 1889 NICHOLSON, W. E., F.E.S., Lewes, Sussex. *l*.
- 1886 NUSSEY, B. L., 167, Jarvis Street, Toronto, Ontario, Canada. *l*.
- 1872 OLDHAM, C., 2, Warwick Villas, Chelmsford Road, South Woodford, Essex. *l*.
- 1891 PALMER, J. F., Ewell Road, Surbiton Hill, Surbiton.
- 1892 PANNELL, C., East Street, Haslemere. *l*.
- 1890 PEAKE, A. E., Oakfield, St. Nicholas Rd., Upper Tooting. *l, c.*
- 1884 PEARCE, A. E., 1, Ildersley Grove, West Dulwich, S.E. *b.*
- 1888 PEARCE, J., 4, Borough High Street, London, S.E.
- 1883 PEARCE, W. A., 88, Croxted Road, West Dulwich, S.E. *l, b.*
- 1880 PERKINS, V. R., F.E.S., Wotton-under-Edge, Gloucestershire. *l, h, d.*

YEAR OF
ELECTION.

- 1888 PERKS, F. P., 41, St. Martin's Lane, Charing Cross, W.C.
zoology, mi, pond life.
- 1889 PERRY, J. F., Oscott Cottage, Birmingham. *l, c.*
- 1887 PORRITT, G. T., F.L.S., F.E.S., Crossland Hall, Huddersfield. *l.*
- 1886 POWLEY, W., M.A., Whitton Villa, Hounslow.
- 1888 REID, W., F.E.S., Pitcaple, Aberdeen. *l, continental l.*
- 1887 REINDORP, J., 9, Wordsworth Avenue, East Ham, E. *o, l.*
- 1887 RICE, D. J., 7, John Street, Bedford Row, W.C. *orn.*
- 1887 ROBINSON, A., B.A., F.E.S., 1, Mitre Court, Temple, E.C. *l.*
- 1893 ROBINSON, F. J., Jun., 49, Charing Cross, W.C. *l.*
- 1888 ROBSON, H., 5, Winterwell Road, Brixton Hill, S.W. *l, b.*
- 1890 ROWNTREE, J. H., Westwood, Scarborough. *l.*
- 1887 ROUTLEDGE, G. B., F.E.S., 50, Russell Square, W.C. *l.*
- 1891 RUFFLE, G. W., 16, Coleman Road, Camberwell, S.E.
- 1887 RUSS, P., Culleenamore, Sligo, Ireland. *l.*
- 1891 SABEL, E., F.Z.S., F.E.S., F.R.G.S., Linton House, South Side, Clapham Common, S.W.
- 1886 SALWEY, R. E., F.E.S., 3, Berkeley Place, The Ridgeway, Wimbledon, S.W. *l.*
- 1888 SAUZÉ, H. A., 4, Mount Villas, Sydenham Hill Road, S.E. *l.*
- 1894 SCORER, A. G., Abercorn Lodge, Upper Hamilton Terrace, N.W. *l, orn.*
- 1888 SHORT, A., 14, Melody Road, East Hill, Wandsworth, S.W. *l.*
- 1893 SILLAR, R. L., 44, Castle Hill Avenue, Folkestone.
- 1886 SKINNER, G. 177, Heath Road, Wandsworth Road, Clapham, S.W. *l.*
- 1890 SMITH, W., 9, Hill View Place, Paisley. *l.*
- 1890 SMITH, W., 1, Denmark Villas, Albert Road, Teddington.
- 1882 SOUTH, R., F.E.S., Oxford Road, Macclesfield, Cheshire. *l.*
- 1873 STANDEN, R., F.L.S., F.E.S., Thorpe Hall, Colchester. (*Life member*). *l.*
- 1872 STEP, E., *President*, The Mays, Ladbroke Road, Epsom, Surrey. *b, m, orn.*
- 1892 STEPHENS, A. L., 6, Glen Mohr Terrace, Greenwich, S.E.
- 1872 STEVENS, S., F.L.S., F.E.S., Loanda, Beulah Hill, Norwood, S.E. *l.*
- 1889 STURT, W. T., West House, Queen's Road, Kingston Hill. *l.*
- 1894 TARBAT, Rev. J. E., The Common, Weybridge. *l.*

YEAR OF
ELECTION.

- 1873 TUGWELL, W. H., Ph.C., 6, Lewisham Road, Greenwich,
S.E. *l, b.*
- 1887 TURNER, H. J., F.E.S., *Hon. Librarian and Report Secretary*,
13, Drakefell Road, St. Catherine's Park, S.E. *l, orn.*
- 1886 TUTT, J. W., F.E.S., Rayleigh Villa, Westcombe Park, Black-
heath, S.E. *l.*
- 1887 VERRALL, G. H., F.E.S., Sussex Lodge, Newmarket. *d.*
- 1889 VINE, A. C., 38, Temple Street, Brighton, Sussex. *l.*
- 1889 WAINWRIGHT, C. J., 147, Hall Road, Handsworth, near
Birmingham. *l.*
- 1880 WALKER, J. J., R.N., F.L.S., F.E.S., 23, Ranelagh Road, Marine
Town, Sheerness. *l, c.*
- 1890 WALLACE, G., 6, Borough High Street, S.E. *l.*
- 1888 WALLER, R., 273, Clapham Road, S.W. *l.*
- 1886 WALSINGHAM, The Right Hon. Lord, M.A., LL.D., F.R.S.,
F.L.S., F.Z.S., F.E.S., etc., Merton Hall, Thetford, Norfolk
(*Hon. member*). *l, orn.*
- 1890 WARD, A., 66, Richmond Road, Brighton. *l.*
- 1888 WARNE, N. D., 8, Bedford Square, W. *l.*
- 1888 WARNE, W. F., 8, Bedford Square, W. *l.*
- 1887 WATERHOUSE, E. A., 23, Spencer Road, Putney, S.W.
- 1886 WATSON, C. H., 37, Tierney Road, Streatham Hill, S.W. *l.*
- 1888 WEBB, S., Folkestone Road, Dover. *l.*
- 1872 WELLMAN, J. R., 34, Ducie Street, Ferndale Road, Clapham,
S.W. (*Hon. member*) *l.*
- 1872 WEST, W., *Hon. Curator*, 8, Morden Hill, Lewisham Road,
S.E. *l, c.*
- 1878 WEST, W., L.D.S., Cyprus Villa, Lewin Road, Streatham
Common, S.W. *l, mi.*
- 1887 WHIFFEN, W. H., 49, Granville Park, Lewisham, S.E. *l.*
- 1891 WILLIAMS, H., 30, Hanley Road, Hornsey Rise, N.
- 1888 WINKLEY, M. H., 9, Glen Eldon Road, Coventry Park,
Streatham, S.W. *l.*
- 1893 WOLFE, J. J., Skibbereen, Co. Cork, Ireland. *l.*
- 1886 WRIGHT, W. H., Secretary's Department, Somerset House,
Strand, W.C. *l.*
- 1888 YOUNG, J. N., 85, FitzWilliam Road, Rotherham. *l.*

Members will greatly oblige by informing the Hon. Sec. of any errors,
additions or alterations in the above addresses and descriptions.

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| Tapinostola <i>bondii</i> | 115 |
| „ <i>concolor</i> | 108 |
| „ <i>elymi</i> | 14 |
| „ <i>extrema</i> | 108 |
| „ <i>typhæ</i> | 39 |
| Tæniocampidæ, <i>development</i> of <i>pupa</i> of | 61 |

THE SOUTH LONDON
Entomological & Natural History Society,

(Established 1872)

Hibernia Chambers, London Bridge, S.E.

OFFICERS & COUNCIL.

Elected January 24th, 1895.

President.

T. W. HALL, F.E.S.

Vice-Presidents.

C. G. BARRETT, F.E.S.

J. HENDERSON.

Council.

T. R. BILLUPS, F.E.S.

J. H. CARPENTER.

F. E. FILER.

C. A. BRIGGS, F.E.S.

C. FENN, F.E.S.

W. A. PEARCE.

W. MANSBRIDGE, F.E.S.

Hon. Curator.

W. WEST (Greenwich).

Hon. Librarian.

HY. J. TURNER, F.E.S.

Hon. Treasurer.

R. ADKIN, F.E.S., Wellfield, 4, Lingards Road, Lewisham, S.E.

Hon. Secretaries.

S. EDWARDS, F.L.S., F.Z.S., F.E.S., etc. (General Sec.),

Kidbrook Lodge, Blackheath, S.E.

H. J. TURNER, F.E.S. (Report Sec.),

13, Drakefell Road, St. Catherine's Park, S.E.

1894

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THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY,

HIBERNIA CHAMBERS, LONDON BRIDGE, S.E.

The Society has for its object the diffusion of Biological Science, by means of Papers and Discussions, and the formation of Typical Collections. There is a Library for the use of Members. Meetings of the Members are held on the 2nd and 4th Thursday evenings in each month, from Eight to Ten p.m., at the above address. The Society's Rooms are easy of access from all parts of London, and the Council cordially invite the co-operation of all Naturalists, especially those who are willing to further the objects of the Society by reading Papers and exhibiting their Specimens.

SUBSCRIPTION.

*Seven Shillings and Sixpence per Annum, with an Entrance
Fee of Two Shillings and Sixpence.*

All Communications to be addressed to the Hon. Gen. Secretary,
S. EDWARDS, F.L.S., F.E.S., etc.,
Kidbrook Lodge, Blackheath, S.E.

PAST PRESIDENTS.

| | |
|--------------------------------|-----------------------------------|
| 1872 ... J. R. WELLMAN. | 1884 ... W. WEST, L.D.S. |
| 1873 ... „ | 1885 ... R. SOUTH, F.E.S. |
| 1874 ... „ | 1886 ... R. ADKIN, F.E.S. |
| 1875 ... A. B. FARN. | 1887 ... „ |
| 1876 ... „ | 1888 ... T. R. BILLUPS, F.E.S. |
| 1877 ... J. P. BARRETT. | 1889 ... „ |
| 1878 ... J. T. WILLIAMS. | 1890 ... J. T. CARRINGTON, F.L.S. |
| 1879 ... R. STANDEN, F.E.S. | 1891 ... W. H. TUGWELL, PH.C. |
| 1880 ... A. FICKLIN. | 1892 ... C. G. BARRETT, F.E.S. |
| 1881 ... V. R. PERKINS, F.E.S. | 1893 ... J. J. WEIR, F.L.S., etc. |
| 1882 ... T. R. BILLUPS, F.E.S. | 1894 ... E. STEP. |
| 1883 ... J. R. WELLMAN. | |

COUNCIL'S REPORT, 1894.

THE Council of the South London Entomological and Natural History Society, in presenting the Twenty-Second Annual Report to the members, are gratified in being able to state that the affairs of the Society remain in a prosperous condition.

With regard to Membership the outlook is decidedly more encouraging than of late. Since our last annual meeting the number of members elected has been nearly double that of the previous year, namely, twelve, as against seven, while on the other hand the resignations have been considerably less, the numbers being fourteen in 1894, and twenty-two in 1893, and it has been considered necessary to write off only two members for non-payment of subscription as against ten in 1893. We have also lost three of our oldest and most respected members by death, namely, Mr. J. Jenner Weir, Mr. J. Trimmer Williams, and Mr. J. R. Wellman. All three of these gentlemen joined the Society in the first year of its existence, 1872, each had ably filled the presidential chair, Mr. Wellman being its first president, and occupied that position on no less than four occasions; while Mr. Weir relinquished the presidency but a few weeks before his lamented death; and the Council desire to express their appreciation of the services rendered to the Society by these gentlemen, whose death they so deeply deplore.

The present Membership thus stands at 189; and the Council, while having every reason to be gratified with the present position of the Society, desire strongly to impress upon Members the desirability of introducing friends who may become candidates for election, so that not only may the natural shrinkage be counterbalanced, but the numerical

strength of the Society improved, and its work as a consequence more efficiently carried on.

It is gratifying to know from the Auditors' Report that the Finances of the Society are in a satisfactory condition.

In the beginning of the year a Committee of the Council, consisting of Messrs. ADKIN, BILLUPS, BRIGGS, STEP, and TURNER, was appointed to consider and deal with the Field Meetings for the ensuing Summer. It was decided to hold the following :—

Seal Chart, Sevenoaks, on May 19th, under the direction of Mr. ADKIN.

Reigate, on June 9th, conducted by Messrs. BILLUPS and TURNER.

Wisley, on July 7th, conducted by Messrs. BRIGGS and STEP.

A Cryptogamic Meeting was held, on October 13th, at *Esher and Oxshott Commons*, conducted by Messrs. BRIGGS and STEP.

The Council desire to thank the gentlemen who undertook the management of the Field Meetings, and are gratified to know that their efforts were more fully appreciated by a large body of members. The attendance at each of the meetings was considerably in excess of the average of recent years; much useful information was gained, and a considerable amount of material collected; the arrangements that were made for the comfort and convenience of the members attending left nothing to be desired, and the Council are hopeful that the success attending these enjoyable outings may induce an even larger number, especially of younger members, to support them in the future.

The Annual Dinner was held at the Bridge House Hotel on March 1st, and was most successful. About forty attended.

The Abstract of Proceedings for 1894, containing several important papers and a large number of shorter notes on matters of general interest, will be ready for the printer in a few days, and it is hoped will be in the hands of members at an early date.

The Council take this opportunity of thanking those members who have made it a practice to accompany their exhibits by carefully written notes of the chief features of interest regarding them, thus ensuring to themselves the advantage of their remarks being accurately reported, and at the same time greatly assisting the Hon. Secretaries in their arduous duties.

The Library, which remains under the able care of Mr. H. J. TURNER, continues to be freely used by members. The following donations have been made, and the thanks of all are due to the various donors for their valuable contributions.

"The Entomologist," for 1894, from Mr. R. SOUTH.

"The Zoologist," for 1894, from Mr. NEWMAN.

"The British Naturalist," for 1894, from Mr. J. SMITH and Mr. L. GREENING.

"The Entomologist's Monthly Magazine," for 1894, from Mr. M'LACHLAN.

"The Entomologist's Record," for 1893 and 1894, from Mr. HODGES.

"Random Recollections of Woodland, Fen, and Hill" (Tutt), from Mr. J. W. TUTT.

"Proceedings of the Entomological Society," Part I., 1893, from Mr. J. JENNER WEIR.

"The Royal Natural History" (Lyddeker), Vol. I., from Messrs. W. F. and N. D. WARNE.

"The Annual Address to the Entomological Society of London," for 1893, from Mr. H. J. TURNER.

"Miscellanea Entomologica," for 1894, from the EDITOR.

"Bulletin of the New Mexico College of Agriculture," from Mr. COCKERELL.

"The Genera Pieris and Euchloë" (Tutt in "Canadian Entomologist") from Mr. TUTT.

"Science Gossip," for 1894, from Mr. CARRINGTON.

"Transactions of the City of London Entomological Society," for 1893, from the SOCIETY.

"The Beauties of Nature" (Lubbock), from Mr. BILLUPS.

"The Essex Naturalist" for 1894, from the ESSEX FIELD CLUB.

"The Naturalist's Journal," for 1894, from Mr. FORD.

"The Evolution of Sex" (Geddes and Thompson), from Mr. STANLEY EDWARDS.

"British Hepaticæ" (Cooke), from Mr. STEP.

"Man's Place in Nature" (Huxley), from Mr. STANLEY EDWARDS.

"Catalogue of British Coleoptera" (Fowler and Sharp), from Mr. EDWARDS.

"List of British Diptera" (Verrall), from Mr. EDWARDS.

"Notes on the Genera Pieris and Anthrocharis" ("Canadian Entomologist"), from Mr. TUTT.

"Darwinism" (Huxley), from Mr. EDWARDS.

"Bulletin of the Jamaica Institute," 1894, from Mr. COCKERELL.

"The Entomologist's Weekly Intelligencer" (the complete set which belonged to the late Mr. J. R. Wellman), from Mr. R. ADKIN.

"The Entomologist's Monthly Magazine" (also from Mr. Wellman's library), from Mr. ADKIN.

"The Entomologist" (Vol. I., 1842), from the late Mr. WELLMAN.

"Elements of Entomology" (Dallas), from the late Mr. WELLMAN.

"Entomologist's Annual," 1860, from the late Mr. WELLMAN.

"Science Gossip," Index, 1893, from Mr. CARRINGTON.

"Report of the Lancashire and Cheshire Naturalists' Society," 1893, from the SOCIETY.

“British Museum Noctuæ” (“Canadian Entomologist,” Tutt), from Mr. TUTT.

“Report of the Entomological Society of Ontario,” from Mr. LACHLAN GIBB.

“Woodside, Burnside, Hillside, and Marsh” (Tutt), from Mr. C. G. BARRETT.

“By Vocal Woods and Waters” (Step), from Mr. STEP.

“Dispersal of Shells” (Wallace Kew), from Mr. EDWARDS.

Mr. W. WEST continues to act as Curator, and spares no time or trouble in keeping the Collections under his charge in efficient order. He reports that during the year he has completed the re-arrangement of Mr. GIBB'S Canadian Lepidoptera, and that contributions have been made to the British collection by Messrs. R. ADKIN and T. W. HALL. The Council desire to take this opportunity of reminding members that the collections, although in excellent order, are far from complete, and that those who have spare specimens, might add materially to their usefulness as a means of reference, by handing them over to the Curator, who, they have no hesitation in saying, would deal with them to the best possible advantage.

STANLEY EDWARDS,

Hon. Sec.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY.

BALANCE SHEET FOR THE YEAR 1894.

GENERAL FUND.

| <i>Receipts.</i> | | <i>£ s. d.</i> | <i>Expenditure.</i> | | <i>£ s. d.</i> |
|---|-----|----------------|--|-----|-----------------|
| To Balance in Hand | ... | ... | By Rent (1 year) | ... | 25 0 0 |
| " Subscriptions received, 104 at 7/6 | ... | 36 5 4 | " Attendance (1 year) | ... | 2 10 0 |
| " " " 6 " 6/- | 39 | 0 0 | " Printing ... | ... | 5 7 0 |
| " " " 4 " 5/- | 1 | 16 0 | " Postage, Stationery, and Sundries | ... | 5 17 6 |
| " " " 34 " 2/6 | 4 | 5 0 | " Insurance of Library and Cabinets | ... | 0 8 3 |
| " Entrance Fees ... | 8 | 2/6 | " (Fire) ... | ... | ... |
| " Arrears of Subscription | ... | 6 19 6 | Entrance Fees carried to Suspense Account... | ... | 11 12 9 |
| " Subscriptions received on a/c of 1895 | 1 | 15 0 | " Vote to Publication Fund | ... | 1 0 0 |
| " Receipts on a/c of Annual Dinner | 8 | 5 0 | " Expenses of Annual Dinner | ... | 30 0 0 |
| " " " Field Meeting, Seal | 4 | 19 8 | " " Field Meeting (Seal) | ... | 8 5 0 |
| " " " Reigate | 3 | 16 8 | " " " (Reigate) | ... | 4 18 2 |
| " " " Wisley | 5 | 7 3 | " " " (Wisley) | ... | 3 16 8 |
| | | 22 8 7 | " Balance in Hand | ... | 5 3 6 |
| | | | " Balance in Hand | ... | 22 3 4 |
| | | | | | 22 3 4 |
| | | | | | <u>£114 9 5</u> |

SUSPENSE ACCOUNT.

| <i>Receipts.</i> | | <i>£ s. d.</i> | <i>Expenditure.</i> | | <i>£ s. d.</i> |
|-----------------------------------|-----|----------------|---------------------|-----|----------------|
| To Balance in Hand | ... | ... | By Balance in Hand | ... | ... |
| " Entrance Fees from General Fund | ... | 2 12 6 | " " " " | ... | 3 12 6 |
| | | 1 0 0 | | | ... |
| | | <u>£3 12 6</u> | | | <u>£3 12 6</u> |

LIBRARY FUND.

| <i>Receipts.</i> | <i>£ s. d.</i> | <i>Expenditure.</i> | <i>£ s. d.</i> |
|---------------------|----------------|----------------------|----------------|
| To Balance in Hand | | By Binding Books ... | 1 1 0 |
| " Library Fines ... | | " Library Expenses | 0 0 4 |
| | | " Balance in Hand | 1 1 4 |
| | | | 1 7 3 |
| | | | <u>£2 8 7</u> |

PUBLICATION FUND.

| <i>Receipts.</i> | <i>£ s. d.</i> | <i>Expenditure.</i> | <i>£ s. d.</i> |
|---------------------------|----------------|---------------------------------------|----------------|
| To Vote from General Fund | 30 0 0 | By Dr. Balance from 1893 | 4 6 9 |
| " Donations ... | 13 5 3 | " Letterpress Printing, Binding, etc. | 39 18 6 |
| " Sale of "Proceedings" | ... .. | " Balance in Hand | 44 5 3 |
| | | | 0 3 6 |
| | | | <u>£44 8 9</u> |

ASSETS & LIABILITIES.

| <i>Assets.</i> | <i>£ s. d.</i> | <i>Liabilities.</i> | <i>£ s. d.</i> |
|---|----------------|-------------------------------------|----------------|
| To Balance General Fund | 22 3 4 | By Rent, Outstanding Accounts, etc. | ... .. |
| " Suspense Account | 3 12 6 | " Balance ... | ... .. |
| " Library Fund | 1 7 3 | | Nil. |
| " Publication Fund | 0 3 6 | | 32 6 7 |
| " Arrears of Subscriptions £20 2 6 valued | 27 6 7 | | |
| " at say ... | ... .. |  |  |
| | 5 0 0 | | |
| | <u>£32 6 7</u> | | <u>£32 6 7</u> |

Examined, compared with Books and Vouchers, and found correct, January 18, 1895.

C. A. BRIGGS, }
WALTER A. PEARCE, } *Auditors.*

PRESIDENTIAL ADDRESS, 1894.



GENTLEMEN,

I regret that I am unable to be present at the twenty-second Annual Meeting of the Society—I have been present at twenty-one such gatherings—to personally vacate the chair, and to deliver this address with the living voice. My absence from the meetings during the last two months of my term of office has prevented my ready access to those facts and figures relating to the standing of the Society, which have helped some of my predecessors in what all retiring presidents agree is a difficult task—the writing of an address which, while differing from an ordinary paper on a single subject, shall be of interest to our membership generally. There is, however, an advantage in the fact that I shall not be travelling over the same ground as our Secretaries and Treasurer.

The year has not been marked by any special enterprise or new departures in our work, but the ordinary meetings have been well supported, and I think the exhibits and communications have been as varied and interesting as ever. The field-meetings were well organised, and in spite of certain of them falling upon days when the barometer was all against us, were all well attended. In fact, I believe that in no previous season have the excursions been so uniformly well supported. What was done on those occasions you have heard from the Council's report; but apart from the scientific results, a great amount of good was done in the opportunity thus afforded of closer acquaintance between members who otherwise see each other only at our more formal meetings.

We have issued, with the private assistance of a few members, the Abstract of Proceedings for the years 1892 and 1893, and we have that for 1894 in as forward a state as is possible. In spite of the heavy drain upon our exchequer thus entailed, I believe our Treasurer will contrive to show that we are in a satisfactory financial position.

There is one point, I regret to say, in which our experiences have this year been unique, and I trust they may remain so. When at our last Annual Dinner I took occasion of our "coming of age" to take a rapid survey of our twenty-

one years' existence, I little thought such an inroad would be made upon the dwindling band whose membership dates back to 1872; yet since that evening death has deprived us not only of the ripe learning and genial companionship of my predecessor in this chair, but of two other Past Presidents also—all members whose record here goes back to the first months of the Society's existence.

In John Jenner Weir we have lost one of those men whose names alone are of great value to any society to which they may belong; but our loss was the greater in that for years Mr. Weir was a regular attendant at our meetings and at the Council, and his very extensive knowledge of all branches of Biology was thus constantly at our service. A gentleman expressed to me his surprise that we should have waited almost till the last year of Mr. Weir's honourable life before electing him to the presidential chair. Possibly the same thought may have occurred to some of you; therefore it would be well to state that the position was open to our late friend almost any time within the last dozen years. We might almost say in the words of Mark Antony:

"We thrice presented him a kingly crown,
Yet he did thrice refuse;"

and the highest position we could prevail upon him to take was the Vice-Presidency, which he filled for several years, until two years ago he could no longer hold out against our unanimous choice of him as President.

By the passing away of John Richard Wellman we have lost the first President of the Society, and one who did much to shape it and to make its infancy a success. It is a long retrospect from our present gathering in these roomy and comfortable quarters to those hot summer evenings in the small and stuffy room at Dunn's Institute, Newington Causeway, nearly twenty-three years ago, where I first met him. We were perfect strangers, but after a little conversation he and Mr. J. P. Barrett, the Secretary, undertook to be sponsors for me, and I was elected a member. From that evening until many years later we always left the meetings together, and I counted it a pleasure to walk two or three miles out of my way each time in order that I might enjoy his company. In the two succeeding years he was re-elected President, and again in 1883. For very many years he sat upon the Council; and until his illness a few years ago, which shattered his constitution, he was one of the most devoted members the Society had. Many of our members

will have reason to remember his kindly and generous assistance in their early attention to the collection and study of the Lepidoptera.

James Trimmer Williams was another of those who helped to nurse the Society. In those early days he was always present at our meetings, which he considerably enlivened by his frequent recitals of humorous incidents of his collecting expeditions. He sat upon the Council for a number of years, and served as President in the year 1878; but probably few among our present membership had the opportunity for discovering how genial a companion he was.

Turning from those we mourn to those that remain with us: our members have been busy in various directions during a poor season in adding to our knowledge, not only by their exhibits and remarks in this room, but many of them have also been active in contributing to Biological literature, the Entomological journals especially containing communications under names included in our roll of members. The papers and lectures read and delivered at our meetings have been valuable and interesting. I do not intend to go through the list, for I dare say they have already been mentioned in the Council's Report; but I must particularly refer to quite an exceptional one—the exceedingly interesting and instructive lecture entitled “Notes on Common Insects,” by Mr. F. Enock. I wish we could have more such evenings, when we could invite our friends to be present with the certainty that they would understand and be delighted by the lecture. Of course, there are very few men who could supply such charming original portraits in the way of lantern slides, combined with equally original notes of observations couched in such simple and attractive language; but we might try our hands at training men of Mr. Enock's stamp. We have plenty of material in the shape of acute observers, and if the Society had an optical lantern of its own, and it was known how easily simple diagrammatic lantern slides may be made, members would be encouraged to make use of the lantern at most of our meetings. In “Science Gossip” for July, 1894, I called attention to the use the naturalist might make of the photographic camera, and gave a few instances, concluding with this paragraph: “Probably the majority of our readers are members of local scientific societies, and many are in the habit of reading notes or delivering lectures upon some phase or other of our work. All such know the labour involved in preparing diagrams on a scale sufficiently large to enable their audience clearly to follow their remarks. The possessor of

negatives taken from the natural objects can, in a comparatively few minutes, prepare a lantern slide that will enable him, with the aid of the lantern, to throw a greatly enlarged figure upon the screen, giving every detail of form and marking. Even so small an object as a fruiting moss may, without any aid from the microscope, be so successfully photographed natural size, that, when enlarged upon the screen, it will stand forth as a living thing, showing the character of the leaves and stem, habit of growth, forms of capsule and calyptra, even of the peristome in many cases. In many societies the value of the lantern in scientific demonstration is properly understood, although a few years ago it was regarded as a toy, suitable only for the amusement of children. An optical lantern should now form part of the outfit of every scientific society, and an officer should be appointed to look after it." Since writing those words I have learnt that the Belfast Naturalists' Field Club have made good use of the lantern for many years, and have accumulated a large stock of original slides illustrating the Biology and Geology of the North of Ireland. Coming nearer home, the Haslemere Microscopic and Natural History Society—of which I have the honour of membership—make extensive use of the lantern presented by the late Prof. Tyndall. We have clever artists among us who I feel sure would be delighted to help in this direction by drawing slides, and members who are neither artists nor photographers could, at small cost, get lantern slides of special specimens made by almost any photographer.

The foremost object of our Society is "the *diffusion* of Biological science;" but I sometimes fear that we, in common with other scientific societies and workers, are tending more towards the hoarding up in our own records of the knowledge we labour to gain. We have done much, I believe, by means of our splendid exhibitions to interest the public in our studies; but beyond this, I fear, we are following too much in the wake of those who by the adoption of a new language for the recording of their discoveries tend to create a priesthood of science, whose members shall be the sole depositaries of physical knowledge. I was much struck by a remark in "Nature" on the probable effect of Lord Salisbury's Oxford attack on the theory of evolution. After remarking that the verifying evidence that has been accumulating since Darwin published his "Origin of Species" is scarcely known to the unscientific public, "Nature" adds: "The writings of many of the staunchest adherents of evolution have been couched

in such technical, and at times in such uncouth, language, that they could not possibly be understood except by those who have had a long training in the special subject." There is no question about the truth of this statement, and I think we might all do something to modify its force. Do not misunderstand me to be among those who underrate the value of our liquid decasyllables. On the contrary, I fully recognise that there could be no definiteness in our diagnoses of species, genera, and orders, unless we had invented these special terms to describe things and conditions that were unseen and unknown by our Anglo-Saxon forefathers. They, unfortunately, took such delight in the pastime of war that they had no time to devote to the study of science, otherwise they would have made names for us that would have become familiar long since.

My point is that, having invented a scientific vocabulary, there is a tendency to wear it threadbare by using it upon occasions when the simpler Saxon would be equally exact. I have no objection to the author of the description of a new species couching the diagnosis in the purest Latin at his command, so that his brothers in science in far Cathay or elsewhere may read his actual words without fear of loss in translation from English to Chinese; but if he is writing about a well-known plant and wishes to say that the corolla is pitcher-shaped, why not do so instead of calling it *urceolate*? And if the anther opens at the back to discharge the pollen, why in the name of common sense can he not write it down so, instead of saying "*the dehiscence is posticous*"? If the leaf is hoary, is it not better to admit the fact than to disguise your meaning by saying it is *canescent*? So, too, with many of the terms used to denote the forms of leaves, why not say needle-shaped, heart-shaped, kidney-shaped, awl-shaped, and so forth, instead of *acicular*, *cordate*, *reniform*, *subulate*? There is no question of greater exactness in the use of such terms.

I have selected a few instances that came readily to memory from the domain of botany, so that you may not think my remarks personal to those present, who are chiefly entomologists; but possibly on reflection you might find some even of the simple terms used in your descriptions might be laid aside in favour of words better "understood of the people," and expressing your meaning with equal clearness. I know from my professional experience that the general public are always much interested in the facts of nature when put into English, but they turn aside from the

most careful and original monograph that requires to be read with one eye whilst the other is fixed on the most recent dictionary of scientific terms. They do not mind that rational use of scientific words that is necessary to denote things for which there is no English name.

There is another point upon which I should like to say a few words. Are we doing a wise thing in our writing and talking when we so persistently ignore the old folk-names? I know that in many cases those names were applied in the loosest fashion, and many of them therefore became more generic than specific. Why have some organisms got these trivial names attached to them and others not? The answer, I presume, is that our forefathers started on the task of naming the plants and animals around them, but becoming alarmed at its seemingly infinite character gave up almost at the beginning. Or it may be that they could only spare time to label and roughly classify those things that annoyed or pleased them, and those they used as food, clothing, or medicine. However it be, they gave names to a few things and left the bulk for us, and as exactitude is the main reason for having names we made new ones for all, adapting where we could a name that the ancient Greeks or Romans had used for that or a similar creature. Some of the names very happily describe some striking characteristic of the thing named, so that to know the meaning of the name is equal to enabling you to identify the thing at first sight. Such an one is *Drosera rotundifolia*, which years ago, before ever I had seen a figure of the plant, enabled me to know it when I accidentally stumbled across it in Epping Forest. Some of the names are equally misleading in this respect, such as *Campanula rotundifolia*, which would lead one to look for a bell-shaped flower with round leaves. As a fact, it never has round leaves, those of the stem being long and narrow, whilst those from the root (which are referred to in the name) are more heart-shaped than round; moreover, they do not present a permanent character, for they become absorbed or withered before the flowers are open. Scientific names may be quite devoid of definiteness in other respects, as when a plant of the moorland, like the narrow-leaved oat-grass, is dubbed *Avena pratensis*. They may be quite as absurd or more so than the folk-names, when they are merely the names of mythological personages, such as our butterfly names of Hyale, Helice, Euphrosyne, Paphia, Cinxia, and the rest, which tell absolutely nothing of the character, habit, or food-plant of the species. On the other hand, many of

the folk-names are very expressive, though we have quite lost the meaning of others—if they ever had meanings. It is a striking fact that those things to which our forefathers omitted to give names—and in most orders they are the majority of species—remain unknown to the general public to this day. The unscientific world is as much in need of a name by which to remember a thing as we are, and in my opinion we shall not succeed in spreading a knowledge of our native fauna and flora until we have translated into the vernacular those specific names that will bear the process, and invented descriptive English terms for those whose scientific appellations have been borrowed from the gods and goddesses, fates and furies, nymphs and satyrs of the heathen mythology. Whether you are inclined to help in this direction or not, I would at least beg of you, in the interests of the student of folk-lore, of the poet, and of the English literature generally, to save existing vulgar names from loss by disuse; for it is not necessary that science should destroy all sentiment in her burning zeal for accuracy and truth.

We have a number of members who are oologists, and I have been expecting one of them to call the Society's attention to the Act of Parliament passed in July last, entitled, "An Act to Amend the Wild Birds' Protection Act, 1880," whereby County Councils are in effect empowered to prohibit the taking the eggs of any specified species of wild birds within their jurisdiction, or the taking of any eggs whatever within certain areas.

It will be remembered that in the previous session of Parliament, Sir Herbert Maxwell, M.P., brought in a bill to protect the eggs of certain species which from their scarcity in this country were in danger of becoming extinct. That bill was passed by the House of Commons and sent to the Lords, where it was so mauled and hacked in the landlord interest that on its return to the Commons Sir Herbert could not recognise his child, and denied the paternity. In consequence it was abandoned, and was included in the sessional "Slaughter of the Innocents." This last session a new bill was introduced—a sort of hybrid between Sir H. Maxwell's bill and the Lords' "amendments"—and was passed into law. It is as well that all oologists should make themselves acquainted at once with this measure, otherwise they may be venturing into a proscribed area in quest of eggs, and innocently rendering themselves liable to a penalty of £1 for every egg taken. The order must actually be made by the Home Secretary on the motion of a County Council,

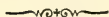
and three weeks' public notice must be given before its operation.

There is no doubt that if properly and fairly applied, this Act may do some good in special cases ; but it has been pointed out that it is more important that the Wild Birds' Protection Act itself should be properly carried out in order that birds may be thoroughly protected during the breeding season. If this is done, it is a matter of minor importance whether a bird's eggs be taken or not, for in most cases she will immediately begin laying again. Further, it may be observed that those species which suffer an enormous loss of eggs at the hands of schoolboys every season are just those that are most plentiful. Again, since the sea-birds were protected from wholesale slaughter by those who called themselves sportsmen, they have greatly increased all round our coast. At the same time, few naturalists will be inclined to cavil at the action of the Cornwall County Council, at whose instigation the Home Secretary has proclaimed the protection of the eggs of the chough throughout the county. This appears to have been a very necessary proceeding, owing to the onslaught made upon its breeding places. If the Act is put in force only in this spirit, it will probably be welcomed by ornithologists. What is sadly needed is a law to make penal the destruction of those distinguished visitors in feathers who cannot alight in our fields or woods or even fly over them without falling victims to some miserable gunner, who considers the possession of their stuffed skins as so many certificates of his prowess as a true sportsman !

Gentlemen, I set out with the intention of making this address a very brief one, but have only succeeded in saying little in many words. I will inflict but a little more upon you. I cannot conclude without thanking my colleagues for their hearty co-operation during my term of office. To my worthy successor my thanks are specially due for his kindness in fulfilling my duties in the chair since I took up my residence in Cornwall ; but I have to acknowledge much kind consideration during the whole of my official connection with the Society. I trust the new year will be one of continued prosperity and extended usefulness to the Society and to every member.

EDWARD STEP.

ABSTRACT OF PROCEEDINGS.



JANUARY 11th, 1894.

J. JENNER WEIR, Esq., F.L.S., etc., *President*, in the Chair.

Mr. Adkin exhibited several series of *Thera juniperata*, L., from various Scotch localities, contrasting them with those which Mr. Turner had exhibited at the previous meeting from Purley. He especially noted the greater distinctness of the apical streak, as well as the more general clearness of the markings in the Scotch specimens. In several of the latter the band was broken.

Mr. Oldham exhibited a very varied series of *Hybernia defoliaria*, L., and specimens of *H. aurantiaria*, Esp., from Epping Forest; also a well-marked specimen of the local *Libellula quadrimaculata*, L., from Cambridgeshire.

Mr. South showed a series of remarkable varieties of *Cerastis vaccinii*, L., taken in Kent and Surrey, with a series of *C. ligula*, Scop. (= *C. spadicea*, D.L.), for comparison. He also exhibited a specimen of *Acronycta aceris*, var. *infuscata*, Haw., from Kent.

Mr. W. A. Pearce exhibited some very beautiful Rhopalocera from Alleghany Co., U.S.A., taken in 1892-93, viz.:—*Papilio asterias*, Fb., *P. turnus*, L., *P. philenor*, L., *P. troilus*, L., *Limenitis dissippus*, Galt., *L. ursula*, Fb., and *Apatura clyton*, Bd.

Mr. Weir stated that the female of *P. turnus* was dimorphic, the light females shown being the northern form, while further south a darker variety, var. *glaucus*, was found. Mr. Weir also called attention to *L. dissippus*, which he said was the mimic of the cosmopolitan *Anosia plexippus*, L.

Mr. Mera exhibited *Charaxes athæron* and *C. brutus*, two species of Nymphaline butterflies sent by Mr. Forrester from Delagoa Bay.

Mr. Auld exhibited an example of *Vanessa io*, L., which had been exceedingly greasy, but which had been submitted by Dr. Knaggs to his process of cleaning with methylated ether. The specimen was perfectly restored to its pristine state. It was remarked that this specimen was abnormal in

having additional ocelli on the hind wings, and that the blue of the larger ocellus was very curiously distributed.

Mr. Tugwell sent for exhibition a series of three forms of *Spilosoma lubricipeda*, among which were var. *radiata*, Haw., the "York City form" (erroneously called *radiata*), and a banded form which he proposed to name var. *fasciata*. Of the latter there were three rows of males and two rows of females, and in his note accompanying the exhibition Mr. Tugwell said of these that they were the progeny of one pairing, but that all the specimens were not of the extreme form to which the varietal name applied. In all of them, however, there was a tendency to exhibit the characters which were distinctive of the variety—*i.e.*, a strong central fascia and the suppression to a great extent of the usual diagonal rows of spots. Attention was also called to the ?-like markings on all four wings of many of the specimens. Referring to the York City form, and comparing it with true *radiata*, it would be "evident to anyone that, although somewhat alike, yet they were quite distinct." In the former the diagonal row of markings is very strongly in evidence, whilst in *radiata* this character is looked for in vain."

Among other species exhibited by Mr. Tugwell were a pair of *Plusia moneta*, Fab., bred by Mr. G. Matthews, from Sittingbourne, with a cocoon on the food plant, *Aconitum napellus*, L.; three dark Irish specimens of *Agrotis lucerneæ*, L.; six specimens of the dark form of *Boarmia repandata*, L., from Sheffield; four *Dicranura bicuspis*, Bork., bred from Tilgate; eleven *Callimorpha hera*, L., bred from ova from Starcross, Devonshire; two *Pachetra leucophæa*, View., taken on the North Downs by Mr. Hanbury; six of the remarkable dark Irish form of *Camptogramma bilineata*, L.

Mr. Weir called the attention of members to Dr. Chapman's paper "On the Structure of Heterocerous Pupæ, and their Value in Classification," published in "Trans. Ent. Soc.," Pt. I., 1893.

JANUARY 25th, 1894.

ANNUAL GENERAL MEETING.

J. JENNER WEIR, Esq., F.L.S., F.E.S., etc., *President*,
in the Chair.

The evening was devoted to receiving the reports of the Council and Officers for the past year, the reading of the President's address, and the election of Officers and Council for the ensuing year.

The following is a list of the Officers and Council for 1894 :—

President.—Mr. E. Step.

Vice-Presidents.—Mr. J. Jenner Weir, F.L.S., F.Z.S., F.E.S., etc., and Mr. Chas. G. Barrett, F.E.S.

Treasurer.—Mr. Robt. Adkin, F.E.S.

Librarian and Report Secretary.—Mr. H. J. Turner, F.E.S.

Gen. Secretary.—Mr. S. Edwards, F.L.S., F.Z.S., F.E.S., etc.

Curator.—Mr. W. West (Greenwich).

Council.—Messrs. T. R. Billups, F.E.S., C. A. Briggs, F.E.S., J. H. Carpenter, F. E. Filer, F. W. Frohawk, F.E.S., J. Henderson, and R. South, F.E.S.

In vacating the chair, Mr. Weir presented a handsome album to the Society, in which he had placed three photographs of himself—one taken quite recently, the others at earlier periods of his life—and said he hoped that all present and past members, especially those who had held office, would contribute their portraits, as such a collection would, in the future, probably be of great interest and value.

FEBRUARY 8th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. Carpenter exhibited a series of *Xylophasia monoglyphia*, Hufn. (*polyodon*, L.), from Aberdeen, comprising the dark and intermediate forms; also a specimen of *Agrotis*, which Mr. Horne said was *A. cursoria*, Bork., but which was not distinguishable from one form of *A. tritici*, L. Mr. McArthur, however, stated that that form of *A. tritici* was never found in Aberdeen, and that the specimen was undoubtedly *A. cursoria*, Bork.

Mr. W.⁸F. Warne read a short paper, entitled "A Morning's Sport near Rockhampton, Queensland" (p. 118), and exhibited examples of the species referred to.

Mr. W. A. Pearce exhibited series of the following species taken by himself in Alleghany, U.S.A., during 1892 and 1893 :—*Pyrameis atalanta*, L., *P. huntera*, Fab., *Vanessa antiopa*, L., *Polygonia interrogationis*, Fab., the two broods of *P. comma*, Harr., *Telea polyphemus*, L., and *Samia cecropia*, L., the last two being bred. Mr. Carrington said that his experience of *V. antiopa* was that it occurred singly at considerable distances apart, and he remarked how curious it

was that a species whose larvæ were gregarious should never be seen in numbers. Mr. Pearce said that his specimens were not taken together. Mr. Weir said that he had captured the species in France and Saxony, but always singly. He also observed that specimens from the more northern parts of America and from Canada were more spotted on the border. Mr. Frohawk said that a relative of his had seen quite thirty examples at one time in Brooklyn Park, one of which had been forwarded to him. Mr. Auld stated that five specimens were taken at Shirley in 1872. Mr. Carrington said that the late Mr. Eedle took thirteen at sugar in the fens during one week.

Mr. Dennis exhibited a specimen of *Vanessa io*, L., with a small additional ocellus on each secondary (see also *ante*, p. 18), while below the central costal blotch on the primaries was a smaller dark blotch.

Mr. Weir exhibited on behalf of Mr. Adye a specimen of *Phvsia moneta*, Fab., taken at Christchurch, Hants, in 1893, and a nearly black specimen of *Venilia macularia*, L., from the New Forest.

Mr. H. Williams exhibited two specimens of *Pieris brassicæ*, L., of a peculiar brown tint in colour, this appearance having been caused by killing the insects with liquid ammonia, and allowing them to come in contact with a sponge damp with that fluid. It was noticeable in one specimen that an equal area in each of the forewings appeared to be but slightly affected in colour by the action of the ammonia.

Mr. Frohawk exhibited a series of *Argynnis euphrosyne*, L., bred from ova deposited about the 24th of May, 1892, and which hatched in the beginning of June. The young larvæ commenced hybernation at the end of July, and did not finish until March 20th, 1893. The first pupation was on April 25th and the first emergence on May 14th, 1893. Thus the larval stage occupied nearly eleven months. The parent was from Tilgate Forest.

Mr. Weir exhibited *Eucheira socialis*, Westw., a Pierine butterfly, which, in the opinion of Dr. Dixey, was the most archaic form of the sub-family extant. This very remarkable species had been described by the late Professor Westwood in the "Trans. Ent. Soc.," vol. i., p. 44, and a very interesting account was there given of the nests of the larvæ, in which they changed to the chrysalis in large numbers, spinning common pear-shaped cocoons, each of which contained some scores of pupæ. These nests were described as like the

white paper bags in which bunches of grapes were often enclosed in England.

Mr. Billups exhibited on behalf of Mr. Sauzé fifty-four species of Diptera taken in 1893.

Mr. Manger exhibited a specimen of a land crab, *Ocypode cursor*, from the island of Lagos, which was stated to be so nimble as to elude capture alive, having finally to be shot to be secured. The curious brush-like processes on the eye-stalks were very noticeable.

Mr. Carrington exhibited "blown" eggs of a snail, *Bulinus oblongus*, from Trinidad, W. Indies, and stated that they were so exceedingly calcareous as to be easily mistaken for the eggs of a bird, being about the size and general appearance of those of a woodpecker. He also said that they were laid singly at considerable intervals of time, and that the family were generally remarkable for the amount of calcareous matter in the egg shell. Mr. Manger stated that he also possessed specimens of these eggs.

Mr. Sauzé reported that he had received a locust, *Ædipoda tartarica*, taken from a cauliflower which had been imported from Italy last week.

A general discussion then ensued as to the early season. *Nyssia hispidaria*, Fb., was reported as out by February 5th; *Hybernica leucophæaria*, Schiff., and *H. rupicaprarica*, Hb., were said to be fully out by the middle of January, when also *Phigalia pedaria*, Fb., was observed; and *Anisopteryx æscularia*, Schiff., was taken in the end of January.

FEBRUARY 22nd, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. South exhibited, on behalf of Mr. Rose of Barnsley, a long series of *Phigalia pedaria*, Fb. (*pilosaria*, Hb.), bred from a captured dark female in 1894; none of the specimens were quite typical, some males were uniformly black without trace of markings, and all the females were very dark. On behalf of Mr. Fowler of Ringwood, a specimen of *Argynnis aglaia*, L., from Hampshire, which was a modification of var. *charlotta*, Sow., and a var. of *Euchelia jacobææ*, L., in which the costal stripe was produced and carried round the hind margin to meet the spot near the anal angle. He also exhibited from his own collection a variety of *Argynnis euphrosyne*, L., taken in Kent, June, 1890, in which the discoidal cells of forewings were almost entirely filled up with black, with a large black blotch below it, and the spots forming the central

line on all the wings very much enlarged and united. This specimen, he stated, resembled very closely one taken at the same place eleven years before. Mr. South also exhibited another variety of the same species taken in Epping Forest, May, 1889, having the forewings of the normal type, but with hindwings very much suffused with black, the rich fulvous ground colour only appearing as a marginal and submarginal series of spots and in some other ill-defined marks; on the under side the discoidal silvery spot was much elongated.

Mr. Frohawk exhibited coloured drawings representing the complete life history of *Argynnis aglaia*, L., and *A. adippe*, L., every stage being represented with enlarged figures of the segments of the larvæ in the first and last skins to show the remarkable difference of structure.

Mr. Warne exhibited a var. of *Abraxas grossulariata*, L., which was asymmetrical, the left forewing being very ordinary, while the right had two long dark streaks, one below the costa and the other from near the centre of the base to the centre of the submarginal band.

Mr. H. Moore exhibited several cases of insects of all orders, collected during a bicycle tour through France to Geneva, passing through Dieppe, Paris, Etampes, Dijon, and across the Jura mountains, in 1893. He stated that Coleoptera, which he had previously found to be well represented on this route, were on this occasion exceedingly scarce; Orthoptera were numerous, especially in the more southern portion of the journey. Hymenoptera seemed plentiful, wasps and hornets being in abundance. He had paid particular attention to Lepidoptera, and noted that *Colias edusa*, Fb., was very rare, few being seen, and then only single individuals, and at long distances apart; *C. hyale*, L., was fairly common in the mountain districts; the Vanessidæ were extremely rare: no *V. io*, L., nor *V. antiopa*, L., being seen, and only one *V. urticæ*, L., during the whole time; *Pieris rapæ*, L., was very common, *P. daphnide*, L., was common, and, locally, *Leucophasia sinapis*, L., and its vars. could be taken in numbers; the Argynnidæ were very plentiful, *A. latonia*, L., could be taken by the dozen in some places, and around Geneva *A. dia*, L., was in swarms; the Satyridæ often rose in clouds from the roadside, and were remarkable for the completeness with which they disappeared and assimilated themselves to the soil and surrounding objects, *S. circe*, Fab., and *S. briseis*, L., being very noticeable for such habits; *Erebia æthiops*, Esp., *Cænonympha pamphilus*, L., and *Lycæna corydon*, Fb., were all exceedingly common, while

very strangely only one or two *Chrysophanus phlaeas*, L., were observed; perhaps the most beautiful series in the exhibit was that of *Zygæna fausta*, L., a species which was fairly common. There was also a long series, including both the red and blue-winged forms of the pretty Orthopteron *Ædipoda fasciatum*, Fisch.

Mr. W. A. Pearce exhibited beautiful series of four species of Lycænidae, from Pennsylvania, viz., *Feniseca tarquinius*, Fab., *Lycæna pseudargiolus*, Bd. (both spring and summer broods), *L. comyntas*, Godt., and *Thecla edwardsii*, Saund.

Mr. Auld exhibited, on behalf of Mr. W. H. Tugwell, a series of the York City form of *Spilosoma lubricipeda*, which he stated Mr. Tugwell proposed to name var. *eboraci*; and also series of vars. *radiata* and *fasciata*. Mr. Auld said that surprise had been expressed at the number of *radiata* extant in so short a time, but as one female lays as many as 700 eggs, and the species could be reared very easily, it was not improbable that quite 500 imagines might be obtained. Of these, supposing only 200 were females, it could be seen that in the third generation an enormous number would be produced even by one collector. Mr. Carrington stated that very little attention had hitherto been paid to the artificial selection of Lepidoptera, and considering that many animals and birds produced extraordinary variation under man's guidance, it was not surprising that such varieties as had been exhibited should have been obtained in considerable numbers.

Mr. Carrington exhibited a shell of *Helix pomatia*, L., which he had cut and ground to show the arrangement of the spiral and the smooth internal layer. He stated that the mollusc was surrounded by a viscid liquid, which it had secreted, and which formed an excellent varnish if rubbed over the outside of the shell, making it very glossy. He considered this varnish to be a solution containing silica.

Mr. Jenner Weir exhibited a new species of the Limnaine division of the Euplœinæ, which he had described, and was about to figure under the name of *Caduga crowleyi*. This fine species was from North Eastern Borneo.

A paper by Mr. Lewcock, entitled, "Coleoptera collected at Eynesford on June 20, 1891, and at Oxshott on June 10, 1892, during the Society's Field Meetings on those dates," (page 84), was then read, and examples of the species referred to exhibited.

Mr. Carrington referred to the dark varieties of many species which had recently been exhibited at the Society's meetings, and stated that melanism was local variation pro-

duced by natural selection, but that it did not necessarily mean that darkening was the result of the same causes in every locality. The dark varieties taken in Shetland and the Hebrides were no doubt produced by a different preponderating cause from that which resulted in the counties of York and Lancaster. He spoke of the remarkable extension of melanism in the two latter districts during the past fifty years, making especial mention of *Tephrosia biundularia*, Bork., of which now it was difficult to find a typical specimen, while then it was equally difficult to get a dark variety. He considered that the use of coal, which had increased so enormously in those districts of late, was the primary cause. The vegetation was always dirty, and trees were permanently blackened by the smoky deposit, thus rendering it necessary for their own preservation that certain insects should assume a garb assimilating more to their environment. Among other species, he mentioned the increasing frequency of dark vars. of *Amphidasys betularia*, L., *Polia chi*, L., and *Aplecta nebulosa*, Hufn. In some localities the type forms of these were certainly rare. Several members had noted the increasing numbers in which *Hybernia leucophæaria*, Schiff., of a black, suffused coloration, were taken, and Mr. Step said that, around London for many miles, lichens had ceased to grow on the sides of trees exposed to winds which carried an appreciable amount of smoke.

Mr. Adkin read the following communication from Mr. W. Mansbridge :—

“Many of you know that I spent last summer in the Indian Territory of North America—a tract of land set apart by the U.S. Government for the Indians, lying between Kansas, north and Texas, south.

“In driving across the prairie I was much interested in watching the swallows hawk for the moths that were kicked up by the horses. No matter how far we went, a flock of swallows, varying in number from ten to fifty, sometimes nearer a hundred, always accompanied us. There is usually a breeze blowing on the prairie, and of course the moths went with the wind; the swallows had found this out, and accordingly *always* kept to windward of the buggy, never crossing unless the impetus of a swoop carried them over.

“The quickness of eye of these swallows is wonderful; they seldom miss, and when they do the insect is never followed, but is snapped up by some other bird.

“The swallow is very like our English species, the only

prominent difference being a pale orange breast, and that, I believe, only in the males.

"I met with the following English butterflies in the Indian Territory last summer, viz.:—*Pieris rapæ*, *Vanessa atalanta*, *V. antiopa*. At St. Louis, Missouri, 400 miles N.E. of Indian Territory, I found:—*Pieris rapæ*, *Chrysophanus phlæas*, *Cynthia cardui*, *V. antiopa*.

"Some forty species of Rhopalocera fell to my net, and about the same number of Heterocera, among which were some melanic examples of a species of *Agrotis*. I did not collect vigorously or very often else my list would have been greatly augmented."

MARCH 8th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. R. Adkin exhibited a series of *Erebia epiphron*, Knoch., var. *cassiope*, Fb., from Inverness, and read the following note:—

"The specimens exhibited fairly represent a long series received from this locality, and it was said that the type (*epiphron*, Knoch.) was included among them. A careful examination of the specimens, however, failed to detect the white pupils to the ocellated spots, by which the type is distinguished from var. *cassiope* in the female; and although I have the species from several Scotch and North English localities, I have never seen one that appeared to show the white pupils."

Mr. Weir said that so far as he knew the British form had no trace of the white spot.

Mr. Routledge exhibited a representative series of a brood of *Selenia bilunaria*, Esp., bred from a female taken in April, 1892. The whole brood had remained in pupa throughout the summer, emerging as moths in April, 1893. Thus a spring brood produced a spring brood, and not a summer form as it usually does. From this latter brood he again bred a series (also exhibited), which had emerged at intervals during the autumn and winter up to the middle of February. All were of the small summer form, although several had the pigment well developed.

He also exhibited a series of *Epunda lutulenta*, Bork., from Cumberland, among which were representatives of both var. *sedii*, Gn., and var. *luneburgensis*, Frr. It was remarked that as recently as 1888 this species and both its vars. had been captured at Darenth Wood Kent.

Mr. South exhibited several exceedingly large specimens of *Ocneria dispar*, L., which he thought from their peculiar setting had formerly been in the possession of the late Mr. Standish, who probably bred them from larvæ collected in the fens, where the species was common many years ago. Mr. Weir concurred in this opinion. The male measured 2 in. in expanse of wings, and the female was $3\frac{1}{2}$ in.

Mr. Frohawk exhibited a series of *Pararge megæra*, L., being a third brood, and comprising ten males and ten females. The ova were deposited on August 2nd, 1893, the larval stage lasted about twenty-five days, and the imagines emerged from September 24th to October 5th. The parent was captured on July 31st at Cudham. Mr. Jenner Weir remarked that *megæra* was Westwood's type of the genus *Pararge*.

Mr. Billups exhibited three species of rare Ichneumonidæ, namely, *Microgaster russatus*, Hal., *Hyperacmus crassicornis*, Gr., and *Euryproctus nemoralis*, Fouce. The first, Mr. Billups stated, belonged to the family *Braconidæ*, and was the most showy and conspicuous species of the sub-family *Microgaster*, and was exceedingly rare. According to the Rev. T. A. Marshall the British Museum contains but one male from Haliday (Ent. Soc. Coll.), two males and one female from Stephens' collection, and three males from Desvignes. He had seen five males and two females from Berlin, Danzig, and Oranienburg. Wesmael captured a male near Brussels, and two others are recorded by Herr Snellen von Vollenhoven, taken at Rotterdam. Mr. Billups had captured two males at High Beech, Epping Forest, in 1884, and these were now in the collection of the Rev. T. A. Marshall. The present specimen, which is a female, was taken by himself, June 16th, at Bromley in Kent, while sweeping some low herbage growing in a very dirty pond in the district. The second species, *Hyperacmus*, had only been recorded once, and was taken by Dr. Capron at Shere, near Guildford, in the summer of 1881. Mr. Billups captured his solitary specimen, which is a female, at Oxshott, in June, 1892. The two specimens of *Euryproctus* were females, and also extremely rare, they were taken by himself at Oxshott, in July, 1892.

Mr. Filer exhibited a varied series of *Hybernia leucophæaria*, Schiff., taken at Richmond and Epping between February 4th and 18th, among which were a number of exceptionally dark forms. Several members said that they had found these latter forms rather freely this season.

Mr. Jenner Weir exhibited *Heteronympha merope*, Fab., male and female, which he had received from Mr. F. Billingham, of Castlemain, Victoria, and contributed the following note:—

“The sexes of this species are so totally unlike, that until recently they had been deemed distinct species. The authors of the “Victoria Butterflies,” Messrs. Anderson and Spry, state that ‘the chrysalis is contained in a frail network on the ground, and is not attached in any way. The genus *Heteronympha* as at present constituted is very heterogeneous. In *H. philerope*, for instance, there is an androconial patch, densely clothed with scales at the base of the primaries, extending over two-thirds of the discoidal cell. In *H. banksii* the patch is very much less and would scarcely be noticed. In *H. merope* much the same condition obtains in the primaries, but there is a large androconial patch surrounding the discoidal cell of the secondaries, leaving the cell entirely free from these singular scales.”

Mr. H. Williams exhibited the rare snake *Coronella lævis* and contributed the following note:—

“The snake exhibited this evening was taken by me so long ago as August, 1883, and I am indebted to Mr. Jenner Weir and Mr. Step for the confirmation of its identity as *Coronella lævis*, Boie., a reptile concerning which a considerable amount of doubt existed as to its being an indigenous species when the first specimen was captured here a comparatively few years ago. The snake in question was killed on the range of heather-clad hills between Camberley in Surrey and Yatley in Hampshire, and it is impossible to say at this time on which side of the county border it was taken, but in any case it is regarded by Mr. Step as being extremely interesting to have an authentic capture recorded from the extreme northern division of Hampshire, as its main records have previously been from the south, or Bournemouth district of that county.”

Mr. Auld exhibited, on behalf of Dr. Knaggs, a working model of the decoy and net described in the “Entomologist” for 1893, vol. xxvi., pp. 180, 207. The animated appearance of the decoy, worked at a distance of from ten to twenty yards, was a remarkable feature in the exhibit. It was also well demonstrated that Dr. Knaggs’ net in the rapidity of its action equalled, if it did not surpass, that of a photographic shutter.

Mr. Weir remarked upon the singular attractiveness which certain objects had for certain species, mentioning that the

"whites" would often fly down to a piece of broken plate, while the species of the genus *Argynnis* were equally attracted by brown leaves lying on the ground. He stated that the most attractive object to the Ornithoptera was the exceedingly offensive decaying carcase of a python. Those who were physically incapable of chasing insects could still pursue their study with such an aid as this decoy. Referring to the ridicule which had been thrown upon it, he remembered that when "sugaring" was invented it was looked upon in a similar manner.

Mr. South said that the contrivance was of considerable merit. It was not absolutely necessary perhaps to have a specimen of the species desired as a decoy, because an imitation insect, or a bait of some noxious substance, or even pieces of looking-glass could be used. Many species in the tropics were almost unobtainable, from their accustomed haunts being at the tops of the trees in the forests, and in the capture of such no doubt the trap would be of the utmost service.

Mr. Step called the meeting's attention to the flowering of the butcher's broom (*Ruscus aculeatus*, L.), and said that most authorities stated that the flowers were produced singly. This, however, he had found not to be so; they were in pairs on the phylloclade, but only one bud opened at a time, the second appearing after the first had fallen. The flowers and buds being small had aided in this interesting fact remaining unknown.

Mr. Billups made reference to bats having been seen during the mild January, February, and March, flying around St. Saviour's Church in the Boro'.

Mr. Winkley referred to a recent letter in the "Standard," the writer of which stated he was positive he had seen a cuckoo in the winter. Mr. Weir said it was quite impossible for a cuckoo to pass the winter here; it was an insectivorous bird, feeding mainly upon larvæ which everyone knew could not be obtained in the winter, hence it must be starved to death. Several members suggested that it was a merlin, which in general appearance and habits the cuckoo considerably resembled.

A long discussion took place on the process and method of swallowing by snakes. It was stated that a snake gradually put himself outside his prey, moving his jaws forward alternately, first the top and then the bottom, and also using the two sides of each jaw in a similarly alternate way. The hind legs of a frog were usually taken in first, but frequently

a fore leg, or two legs on one side. Mr. Step mentioned that he once had a snake which attacked a frog somewhat too large for it to swallow. Four times the frog almost disappeared, but each time when the snake rested before its final effort, it was so exhausted that it had not sufficient strength to prevent the escape of its prey. The frog was given its liberty and was still alive, although the snake died, no doubt from the overstrain. Several members spoke of the remarkable scream produced by the frog when followed by a snake; and Mr. Weir said that a stick rustled in the grass and leaves, would often cause them to scream.

Mr. Weir recorded a remarkable instance of a change of habit in a cat. It had become a vegetable feeder, and absolutely refused all flesh food whatever. At its death it was dissected by its owner, and its intestine was found to be quite two inches longer than the normal length. Mr. Winkley said that a race of cats on Monkey Island in the Thames were accustomed to swim daily to the mainland, even across a considerable current.

Mr. Frohawk noted that both the weasel (*Putorius vulgaris*) and stoat (*Putorius erminea*) were to be found on Tooting Common.

MARCH 22nd, 1894.

E. STEP, Esq., *President*, in the Chair.

Rev. J. E. Tarbat, The Common, Weybridge, was elected a member.

Mr. South exhibited a long series of *Tæniocampa gothica*, L., bred from ova obtained from Perthshire, which he had received from Mr. Rose, of Barnsley. About half the specimens were of the *gothicina* form, and all were of a deep red shade and large in size. The gradations between the type and the named var. were well shown.

Mr. Adkin remarked that all the specimens had a peculiar tint running along the costa of the forewings. Mr. South also exhibited buds of *Arundo phragmites*, L., from Hampshire, which were infested by a large dipterous larva.

Mr. Turner exhibited a long series of *Hybernia leucophæaria*, Schiff., taken this year in Surrey, among which were a considerable number of melanic specimens. One of the latter was intensely black, with a slightly lighter shade across the primaries. There were also a considerable number of the white banded form.

Mr. Adkin also exhibited a series of this species, which

he had received from the New Forest, and stated that it would seem that the white banded form was the common one, while the ordinary mottled form of the suburbs of London was an exceptional one in the New Forest. The melanic form was apparently unknown, or at least exceedingly rare in that district.

Mr. Auld reported that he had taken *Tæniocampa munda*, Esp., at sugar in West Wickham Woods.

Mr. Turner stated that he had taken *Asphalia flavicornis*, L., *Diurnia fagella*, Fb., and *Semioscopus avellanella*, Hb., in the same woods, and had also found *Thera variata*, Schiff., in the larval stage nearly full fed.

APRIL 12th, 1894.

E. STEP, Esq., *President*, in the Chair.

The President referred in deeply sympathetic terms to the great loss the Society had suffered by the death, on March 23rd, of Mr. J. Jenner Weir, F.L.S., one of its vice-presidents, and the president during 1893. He remarked upon the vast range and depth of his knowledge of natural history, his devotion to its study, and the genial social qualities which had made him so well known and honoured in many biological circles. The President also stated that the Council had unanimously passed a resolution that a letter of condolence be sent to Mrs. Weir, and suggested that a similar motion should also be passed by the Meeting.

Mr. Auld said that for the past thirty years Mr. Weir had been his close personal friend, and that he himself greatly felt the loss. He then proposed the following resolution:—

“That the Society deeply deplored the sudden death of Mr. John Jenner Weir, F.L.S., F.Z.S., F.E.S., its past president, and desires to record its appreciation of the deep interest he has always taken in the Society’s welfare. The Society also begs to offer Mrs. Weir the expression of its sincere sympathy in her sad bereavement.”

Mr. Winkley, as a representative of the younger members, seconded the motion, which was unanimously passed.

Mr. Carpenter exhibited long series of *Hybernia leucophæaria*, Schiff., from Coombe Wood, West Wickham, and the New Forest, taken in January and February, 1894. A considerable number of the Coombe Wood specimens were melanic, and of the same type as those previously exhibited from Richmond. The New Forest specimens showed the

prevalence of the white banded form which Mr. Adkin had noted at the last meeting; and those from West Wickham were of the usual suburban mottled form. He also exhibited ova of *Trachea piniperda*, Panz., deposited in rows along the needles of pine, from the New Forest.

Mr. Adkin exhibited on behalf of Mr. Billups the following Diptera:—

Meigenia majascula, a species new to Britain. Captured by Miss Billups in their garden at Dulwich, June 6th, 1893;

Sciomyza rufiventris, Mg., an exceedingly rare dipteran. Captured by Mr. Beaumont in Ireland, September, 1893;

Degeeria pulchella, of which there is only one other recorded specimen, bred by Mr. Adkin from *Peronea maccana*, and to whose kindness he was indebted for the same;

Urellia eluta, Mg., a male of this very rare species, which was captured while sweeping herbage at Lewisham. Also a solitary specimen of the genus *Phorbia*, at present undetermined;

Also galls of *Dryophanta divisa*, Alder., with the maker and one of its inquilines, or “burglars,” i.e., *Synergus allipes*, Htg., and five species of true parasites, or “murderers,” which he had bred from the same, namely, *Mesopolobus fasciventris*, *Syntomaspis caudatus*, *Eupelmus urozonus*, *Decatoma biguttata*, and a solitary Chalcid, which he had not been enabled to determine.

Mr. Robert Adkin exhibited long series of *Noctua glareosa*, Esp., and *N. augur*, Fb., and read the following notes:—

“*N. glareosa*, although liable to but little variation of pattern, appears to show considerable range in the tone of colour. Taking the pretty, almost silvery, grey of the most usual form as a base, we find the variation running in two directions, the one towards black, the other to red. Thus, commencing with the most northerly specimens, we find among those from Shetland a very large percentage of very dark grey, and almost completely black examples, while among the Scottish mainland series, comprising Sutherland, Aberdeen, Elgin, and Perthshire, a dark grey is the extreme, and this only in a comparatively small number of the specimens. Some of the Yorkshire examples also show a tendency in this direction, while a smaller proportion have a decided pinkish shade, but among the Kent, Devonshire, and North Irish series this form becomes more pronounced, and the dark grey disappears. In *N. augur*, what little variation there is is also in the tone of colour, but whereas the Scottish and South English series are singularly alike in this respect,

that from North Wales shows a considerable proportion of lighter coloured examples."

He also exhibited on behalf of Miss M. E. Adkin a bloom of the rare plant *Tulipa sylvestris*, L., from Suffolk, taken in an old chalk-pit near Bury St. Edmunds, and thence transplanted by Mrs. Hutchinson to her garden at Leominster.

Mr. Carpenter stated that he had had blooms of the white variety of the fritillary (*Fritillaria meleagris*, L.) sent him from the Midlands.

Mr. Moore exhibited a piece of oak from an old barge which had been destroyed by *Dermestes vulpinus*, Fab.

Mr. C. A. Briggs exhibited a number of very striking varieties of *Abraxas grossulariata*, L., and contributed the following notes:—

"Descriptions based on Newman:

"1. Fore-wings. Third, fourth, and fifth black costal blotches united into one long angular costal blotch. The transverse band very strongly marked. The whole of the rest of the space between it and the basal blotch orange, except a slight spot in the disk, and one on the inner margin. Hind-wings. Fairly normal. Marginal spots and band strongly developed.

"2. Hind-wings very similar to Newman's second figure, but slightly darker.

"3. Fore-wings with two black transverse bands, commencing on the costa at the fourth and fifth costal blotch respectively. Hind-wings with two transverse rows of united black spots across the disk, forming two complete bands. Row of spots on margin strongly developed.

"4. Fore-wings and left hind-wing fairly normal. Right hind-wing with a large black triangular blotch commencing at the base and extending to the outer margins, occupying the whole of the inner half of the wing.

"5. Very similar to Newman's fourth figure.

"6. Fore-wings entirely black, except a slight white spot at the tip of the wing, and a small white blotch in what should be the angle of the transverse band. Hind-wings normal.

"7. All the wings rich dark smoky colour, through which the normal markings can be faintly seen.

"8. Newman's fifth figure, very large specimen.

"9. All the wings normal in markings, but suffused with orange, especially the fore-wings."

Mr. Jäger exhibited a specimen of *Biston hirtaria*, Clerck., which he had just taken. It was crippled on the right side, and he stated that he had noticed a considerable number of

cripples this year, and that all were malformed on the same side.

Mr. E. Step exhibited some splendid specimens of the Morel (*Morchella esculenta*, L.), of large proportions ($6\frac{1}{2}$ inches high), received from Mr. Charles M. Penly, of Wotton-under-Edge, Gloucestershire, where they were then fairly common in woods, meadows, and on banks by the roadsides, in very dissimilar forms and sizes.

Mr. Adye communicated a note that in the New Forest the oak was in full leaf, that *Vanessa polychloros*, L., and *Gonopteryx rhamni*, L., were very common, and that *Lycæna argiolus*, L., had been seen. Mr. Carpenter said that *V. polychloros* was very common last season, but had suddenly gone into hibernation very early. Mr. Adkin said it was characteristic of most of the Vanessidæ to remain only a limited time on the wing prior to hibernation.

Mr. Step said that everything seemed again to betoken a short spring and an early summer. The bluebell was in flower, the chestnut spikes were very forward, the cuckoo had been heard at Holmwood on the 5th inst., and the nightingale some few days previously, while many members had seen *Pieris rapæ*, L., at Easter.

The President said that for years he had been in the habit of finding toads lying dead around the edges of ponds at this time of the year, every one of them having the abdomen slit open, and he had put it down to the cruelty of thoughtless boys. However, just recently he had been able to prove that ducks were the delinquents. He had repeatedly seen them dive, and having seized a toad by the leg, drag him to the surface. Then, having deftly turned it over, the duck would most viciously tear open the abdomen, but carefully avoid the back where the acrid glands are situated. A considerable discussion ensued, Messrs. C. G. Barrett, Winkley, and others taking part.

APRIL 26th, 1894.

E. STEP, Esq., *President*, in the Chair.

Rev. M. Corden Jones and Mr. Francis Fell were elected members.

Mr. Dennis exhibited a male specimen of *Pararge egeria*, L., which varied from the typical form in having the light markings very much reduced in area and the dark markings

much intensified. This example, together with a female specimen, which varied in the same direction but not to the same extent, were bred from ova deposited by a typical female. All the other specimens were like the female parent.

Mr. Auld exhibited a series of *Tæniocampa munda*, Esp., with several specimens of var. *immaculata*, Stgr., taken at West Wickham; also a series of *T. populeti*, Fb., taken at Westerham.

Mr. Enock gave a most interesting lecture, entitled "Notes on Common Insects," which was illustrated by the oxy-hydrogen lantern.

The President warmly congratulated Mr. Enock upon the skill with which he had carried out such a mass of original observations, and desired both on behalf of the Society and personally to thank him for his great kindness in coming forward to interest and entertain the members and their friends. He thought the various suggestions for farming these little insects under a properly constituted governmental department were admirable, and could only hope that they would some day be carried out in this country in the practical manner this kind of work was conducted in the States.

Mr. Barrett, in proposing a hearty vote of thanks to Mr. Enock, said that his small amount of knowledge of Economic Entomology prevented him from attempting to criticise such an able paper; he was, in fact, perfectly amazed at the wonderful habits and structure of these minute insects, and was delighted to have the opportunity of showing his appreciation of what Mr. Enock had done in original research. He, however, thought that if public opinion were sufficiently raised the government would no doubt follow in the footsteps of the United States, but, at the same time, he was of opinion that our usual climate was not conducive to a very large development of the Hessian fly.

Mr. Auld, in seconding the vote of thanks, spoke of the ignorance of the farmers in general, and suggested a distribution by the government of works with plates of insects which were known to be injurious to crops.

Mr. Enock, in reply, said that he looked upon both farmers and governments as exhibiting ignorance which was really culpable. He also stated that in some districts of England, *e.g.*, South Devon, the Hessian fly undoubtedly does a vast amount of damage.

MAY 10th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. H. B. Lawrence, of Anerley, was elected a member.

Mr. South exhibited some examples of *Boarmia cinctaria*, Schiff., part of a series bred from ova obtained from a female captured at Glengariff, Ireland, by Mr. McArthur. The majority of the specimens bred were cripples, but all agreed with the female parent in colour and pattern, and none were so pale as those exhibited some time ago by Mr. Kane. Mr. Adkin, who had also been breeding this species from the same locality, said that his specimens were characterized by a lighter ground but darker markings, while some were much darker.

Mr. South also exhibited the new Postal Box invented by Dr. Knaggs, and described in the "E. M. M.," vol. xxx., p. 101, 1894. It was thrown across the room, but the insects enclosed were in no way harmed, and members present considered it a very successful device.

Mr. Barrett exhibited, on behalf of Mr. Sydney Webb, of Dover, the pick of his valuable and extraordinary varieties of the "Tigers," viz.: *Arctia villica*, L., five specimens, varying from almost spotless to nearly black; *Arctia caia*, L., fifteen specimens, among them being spotless, brown marbled, pale blotched, half one colour half another, pink shaded, and black suffused; *Nemeophila plantaginis*, L., three specimens, red and pale varieties; and *Callimorpha dominula*, L., four specimens—yellow, white spotted, pink, and dusky. He remarked that most species and groups varied in certain definite directions while possessing very permanent markings. In the Noctuæ, for instance, the stigmata were always present in precisely the same positions, and in the Geometers the first and second lines were remarkably constant in position. Not so in the "Tigers," for in these the markings seemed to have no definite position, and many of the varieties exhibited the most abnormal divergence of marking. Yet, at the same time, in many instances variation was along definite lines. *A. caia* often possessed yellow hind-wings, and the black spots were most variable in size; in fact, it was difficult to find two specimens precisely alike in their markings. These might be called regular forms of variation, while the unicolorous, black, very pale, or unspotted, were by no means to be expected. *A. villica* showed the same range of variation, but not to the same extent. In *C. dominula* there was

a regular tendency for the red to become intensified, or else yellow or pink. The disappearance of the markings in *N. plantaginis* was by no means a regular variation, while the yellow, becoming red, might be expected.

Mr. Frohawk exhibited a specimen of *Vanessa urticæ*, L., taken about thirty years ago, having the blue marginal spots exaggerated, and extending into the black border about twice the usual distance. He had not noticed this variation before, nor had Mr. Fremlin among the large number of this species that he had recently bred.

Mr. Robert Adkin exhibited series of the following species of the genus *Tæniocampa*, namely: *T. gracilis*, Fb., grey and red forms, one of the latter being an almost unicolorous brickdust red; *T. munda*, Esp., varying in colour from decided grey to pale wainscot-brown. In some the usual twin spots were very strongly produced, while in others they were absent (var. *immaculata*, Stgr.); others also had a brown central fascia distinctly outlined. *T. incerta*, Hufn., showing various gradations of colour and ornamentation, the extremes being on the one hand uniformly blackish-grey, and on the other pale grey, mottled with reddish-brown; *T. stabilis*, View., brown, reddish, and grey forms; and *T. pulverulenta*, Esp., the most notable, having a central fascia distinctly indicated by zigzag transverse lines. The whole were taken in the New Forest.

Mr. Williams exhibited a bred specimen of *Pieris napi*, L., in which only the hind-wings had developed; one of the fore-wings was present, but crippled, while the other had apparently decayed in the pupa case, which was also exhibited.

MAY 24th, 1894.

E. STEP, Esq., *President*, in the Chair.

The President announced that Mr. T. W. Hall, F.E.S., had been elected by the Council to fill the post of Vice-President, vacated by the death of Mr. J. Jenner Weir.

Mr. Briggs exhibited, from the Bailey collection, a remarkable var. of the underside of *Lycæna argiolus*, L., the hind-wings having the two spots on the inner margin united, and forming a curved line similar to that often found in the same position in other species of the genus; the two spots close to the anal angle were united to form a short line, and the two spots in the apical angle produced into very long streaks. He stated that it was very unusual to find any striking variation in the underside of this species.

Mr. Briggs also exhibited a variety of *Vanessa io*, L., which he had found in a case hanging on the wall of a roadside inn, showing only a partial development of the "eye" in the hind-wings.

Mr. Fremlin exhibited a large number of specimens of *Vanessa urtica*, L., picked during the last few years from several thousands he had bred. Among them were a series of what he described as premature varieties, *i.e.*, specimens which had not attained to the normal development of colour of the species. In one specimen the second and third black blotches on the costa were united, the spots were nearly obsolete, the usually red and yellow portions being very dark brown, and there was a general suffusion of black scales over all parts of the wings; on the lower wings there was scarcely a trace of the usual band. In another specimen the ground colour was similar, but on the lower wing the red band was present, and the costal blotches were not united. Several specimens showed gradations in the size of the characteristic spots; in one example the upper spot was absent, in another both were enlarged to form square blotches, another had an additional spot above the usual pair, one specimen had an additional spot below, while still another possessed an additional spot both above and below. Another series showed more or less expansion and suffusion of the orange coloration, and there was one example with very light fringes.

Mr. Dennis also exhibited varieties of *Vanessa urtica*, L., picked from a large number bred since 1886. Some specimens possessed large spots, whilst in others the spots were almost obliterated; one possessed a perfect band on the upper wing, and several had an imperfect band; others again showed a large increase in yellow coloration, and one was extremely light on the underside.

Mr. Filer exhibited a series of *Nyssia hispidaria*, Fb., taken in Epping Forest this year.

Mr. Robert Adkin exhibited a long series of *Boarmia cinctaria*, Schiff., bred from ova received from Co. Cork, Ireland. The specimens showed a great range of variation, some having a pale grey ground colour, with the usual markings delicately pencilled in shades of brown; others were much irrorated with smoky-grey, giving them an obscured appearance, and of one remarkable variety the following is a description:—Primaries pale grey, small basal patch, and broad hind-marginal band blackish, crescentic spot pale grey, bordered with blackish shading, and an oblong mark paler than the ground colour between it and the marginal border.

Secondaries: pale grey, broadly bordered with blackish shading. The remainder of the series showed various modifications of the above-mentioned forms.

Mr. Billups exhibited the following Diptera:—*Chortophila setacia*, Mg., a species new to Britain, and captured by himself at Dulwich in June, 1890; *Blepharoptera inscripta*, Mg., male and female, the latter was taken at Oxshott in July, 1891, and the former at Bromley in June, 1892; *Heteromyza atricornis*, Mg., a female taken at Oxshott, July, 1891. Neither of the last-named species had previously been recorded as British. *Hypostena medorina*, Schnr., captured at Oxshott, July, 1891. Of this species Mr. Billups stated there was only one other known specimen in Britain. This was bred in 1890 from *Pædisca sordidana*, Hübn., by Mr. Adkin, who very generously placed it at his disposal. *Sepsis punctum*, F., taken at Bromley in June, 1892, and *Callomyia amœna*, Mg., taken at the same place. Both of these species were extremely rare.

Mr. Billups also exhibited, on behalf of Mr. Manger, a small collection of Coleoptera and Homoptera from South Australia, including, amongst others, *Eunecta australis*, Er., *Sphallomorpha albopicta*, New., *Natalis porcatus*, Fabr., *Carenum politum*, *Odontopus cupreus*, Fab., *Anoplognathus pulchripes*, Bur., *Tetrabolus cylindriciformis*, Cand., *Sisyrum stigmatosum*, Pax., *Unxia læta*, Guer., *Phoracantha senis*, New., *Phoracantha semipunctata*, *Lampruria micardi*, Reich. Several species of Curculionidæ, six species of Paropsis, and two of Chrysomelidæ, which were undetermined. The Homoptera consisted of two species, i.e., *Eurymeta distincta*, Sig., and *E. latifasciata*, Wal.

Mr. Hamm exhibited a selection of Lepidoptera, among which were five varieties of *Chrysophanus phlœas*, L., (1) intermediate between the type and var. *schmidtii*, Gerh., (2) spots on the primaries much enlarged, (3) in which the usual black spots were represented by three apical and two costal dots only, (4) the red band on the hind-wing interrupted, forming a regular series of marginal streaks, (5) a dwarf specimen about two-thirds the normal size; a long series of *Hybernina leucophaæaria*, Schiff., showing light, ordinary, white-banded, brown, and melanic forms; a brood of *Agrotis saucia*, Hb., all the specimens of which were very light, and agreed with the female parent form; a variety of *Lithosia griseola*, Hb., which was of a brown shade instead of the usual leaden hue; and lastly, a very striking var. of *Apamea unanimitis*, Tr., having a light grey colour in the

upper-wing, extending over an area similar to that in *A. ophiogramma*, Esp., and very like a common form of *A. didyma*, Esp.

Mr. Herbert Williams exhibited a long series of *Pieris napi*, L., the progeny of two females of the 1893 spring brood. In one case ova were deposited by a female taken in Northamptonshire, on May 2nd, larvæ hatched on the 10th of that month, fed up rapidly, and commenced to pupate on June 1st, and all were in the chrysalis state by June 7th. None of the butterflies emerged until the spring of 1894. In the second case a female captured at Edgware, Middlesex, deposited ova on May 8th, 1893, the larvæ hatched on May 13th, and commenced to pupate on June 10th. One butterfly, a female, and almost intermediate in form between the spring and summer broods, emerged on June 24th, but all the others remained in the chrysalis until the spring of 1894. Mr. Williams was of opinion that this species requires moisture as well as heat to induce it to leave the pupa.

Mr. Sauzé exhibited species of various orders obtained on the occasion of the Society's Field Meeting at Seal Chart, including Coleoptera: *Cæliodes quadrimaculatus*, *Phyllobius glaucus*, *P. argentatus*, *Coccinella* 18-guttata, *C. decempunctata*, *Telephorus pallidus*, *T. hæmorrhoidalis*, *Dolopius marginatus*, *Erirrhinus tortrix*, *Strophosomus coryli*, *Rhynchites betulæ*, *Luperus flavipes*. Diptera: *Dryomyza flavcola*, *Spilographa zoë*.

Mr. Turner exhibited two specimens of the rare Homopteron, *Centrotus cornutus*, L., taken at Seal Chart by Mr. Lewcock, and read the following note:—

"*Centrotus cornutus* is one of the few, I believe only two, British species of that remarkable family *Membracidæ*. This family is well known for the extraordinary and fantastic processes which are situated on the prothorax. The present species possesses two vertical horns, and behind, the prothorax is produced into a pointed, keeled and irregular spine, of equal length with the abdomen. By far the larger proportion of the species of this family are inhabitants of the New World, where they assume the strangest and most curious forms."

Mr. Turner also exhibited specimens of the shells of *Helix lapicida*, L., from Box Hill.

Mr. E. Step exhibited specimens of *Limnæa peregra*, Mull., taken at Wisley, Surrey, ten days earlier. One of these was remarkable, inasmuch as the periphery of the body-whorl was marked by an ochreous streaky band, 2 mm. in

width, across the lines of growth. When the animal was living this appeared to be much lighter than it did in the empty shell, where it showed clearly as a more opaque deposit of shelly matter. Mr. Step remarked that he had taken a similar specimen many years ago on Putney Heath, but which had disappeared from his collection.

[On the occasion of the Society's Field Meeting at Wisley, on June 16th, Mr. Step was so fortunate as to take a similarly banded var. of *L. peregra* from the same pond.]

Mr. Step then read a paper on "Land Crabs."

In answer to Mr. West, Mr. Step said the ova of land crabs were deposited by some species on land, by others in the water. A few species were born of the same form as the adult, undergoing their metamorphoses within the ovum, but most species were born of an immature form and underwent several metamorphoses, generally in the water, before reaching the adult stage.

In answer to Mr. Williams, Mr. Step said that it was a very tedious and difficult process to prepare specimens of crabs for the cabinet, entailing the almost entire dismemberment of the specimen if large.

Mr. Hall proposed, and Mr. Manger seconded, a hearty vote of thanks to Mr. Step for his interesting paper.

Referring to a newspaper account of a robin building its nest in a chapel on the book-ledge and against a prayer-book and a hymn-book, Mr. Frohawk remarked that this year there were several records of hedge sparrows (*Accentor modularis*, L.) building in old tins. As far as he knew these were the first recorded instances of such nidification, and were very remarkable. He also reported that a pair of robins (*Erithacus rubecula*, L.) had built their nest under the gutter of his house some twenty feet from the ground, and stated that he had been unable to ascertain any similar instances of so unusual a selection by this bird. They worked for only about an hour a day while building the nest. As regards the length of time taken by birds to build, he thought it was generally determined by the desire to lay. If the desire was paramount, the nest would be finished in two or three days; if no great impulse existed, the building might extend over several weeks.

JUNE 14th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. Adkin exhibited, on behalf of Mr. W. H. Tugwell, a

long series of vars. of *Spilosoma lubricipeda*, Esp., and read the following note:—

“In the bottom of the box there are two rows of males and two rows of females, representing the progeny of a cross brood between a female var. *fasciata*, Tug., and a male *radiata*, Cr. (= *zatima*, St.) It will be seen that the brood comes very close indeed to the ‘York City form’ *eboraci*, Tug., and fully 90 per cent. of the brood were of this form, and many of the specimens are very striking. The remainder of the brood were true *radiata*. Curiously not one of the brood was like the female parent *fasciata*, as all had the oblique streak to the apical tip of fore-wing. The under wings agree with those of the female parent.”

[All these forms of *S. lubricipeda* are figured in the “Entomologist,” vol. xxvii., p. 204.]

Mr. Step and Mr. Adkin both remarked upon the interest Mr. Tugwell was evincing in variety breeding.

Mr. Jäger stated that he had bred a series of var. *radiata* this year, but his observations seemed to show that the continued breeding of the form was likely to prove a failure, for although he had left a pair *in cōp.* a whole day, every one of the large batch of eggs obtained had turned out infertile.

Mr. Robert Adkin exhibited several species and varieties, and read the following notes:—

“I exhibit three specimens of *Vanessa antiopa*, L., taken by our fellow member, Mr. Lachlan Gibb, near Montreal, Canada, in April last, and of course after hybernation. Some of our older entomologists used to say that you could always tell a true ‘Britisher’ of this species by its pale border. The American form differs from the European in having the border somewhat narrower, but more particularly in its richer colour and greater amount of brown irroration. Of the three specimens now exhibited two may be easily recognised by these characters as of American origin; in the third, however, the border is decidedly pale, and has almost entirely lost the brown irrorations, its width, moreover, in proportion to the size of the insect, is by no means narrow; and it appears to me to be a good example of the fallacy of relying upon such characters.

“I also exhibit a short series of *Asteroscopus nubeculosa*, Esp., most of them reared from pupæ which went to earth in the summer of 1891. During the past few years I have each spring received a few ova of this species from Rannoch, and have fed up the larvæ from them with varying success. In 1891 they fed up remarkably well, several imagines emerged

in 1893, and others (now exhibited) came forth this year. In 1892 the larvæ were throughout sickly, the result, so far, being the two undersized specimens now shown. Last year the brood was healthy from the time of leaving the egg until pupation, yet no imagines have appeared thus far. Indeed, although I have now had several years experience in rearing this species, I have on no occasion found the imago emerge during the year following that in which the larva fed up, at least two and often three years being spent in the pupa state.

"The five specimens of *Aleucis pictaria*, Curt., were bred from larvæ taken in the New Forest last summer. Of some thirty larvæ that I then had, only about half a dozen were near full growth, the others being in various younger stages, and so far as I have been able to follow them, only those that were on the point of pupating at the time when they were taken have produced imagines, the younger larvæ refusing to feed up in confinement, although liberally supplied with their natural food—blackthorn. This entirely agrees with my previous experience with the species, and I am inclined to think that the peculiar habitat of the larva renders some special treatment, which I have not yet succeeded in discovering, necessary."

Mr. Adkin also exhibited on behalf of Mr. R. Armstrong Adkin, a series of *Cyclostoma elegans*, Müll., taken on the occasion of the Society's Field Meeting at Reigate on Saturday last. The shells showed considerable variation, some being of a uniform bone colour, while others were of the more usual reddish shades and banded, some were also mounted so as to show the operculum peculiar to this species.

Mr. Step remarked upon the wide range of variation shown in the specimens of *C. elegans*, especially as they were obtained in one spot. It was the only British land mollusc which had a true, fully developed, calcareous operculum. It was attached to the tail and presented a very curious appearance when the animal was extended feeding.

Mr. Frohawk exhibited an ovum of *Vanessa c-album*, L., *in situ*, on a nettle leaf, together with larvæ of the same species, showing all five stages of growth. They were from the same parent, and were part of a batch of 270 ova, laid at intervals from April 17th to June 1st. The whole of this large number of eggs were fertile.

Mr. Frohawk exhibited, on behalf of Mr. Fremlin, an interesting variety of *Apatura iris*, L., from Berlin, intermediate between the type and var. *irole*, Schiff.; and on behalf

of Mr. South, a dwarf specimen of *Euchloë cardamines*, L., measuring only $1\frac{1}{4}$ inches in expanse of wing. It was a captured male; also another male of the same species, pale in colour, having the normal orange patch replaced by deep yellow along the nervures, and pale yellow between them.

Mr. Manger exhibited a large collection of insects of all Orders, captured on the s.s. "Kara," by Captain T. Walker, during a voyage from Wales to New York, thence through the Suez Canal to Shanghai and Saigon, and home the same way.

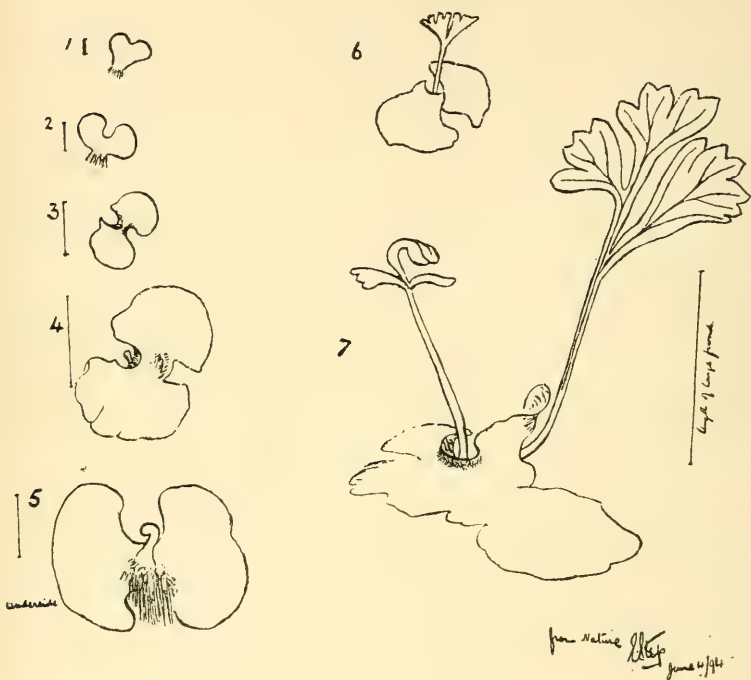
Mr. Step said that such an array of species, caught actually on a vessel, was suggestive of a very effective mode of migration.

Mr. West, of Greenwich, exhibited specimens of *Cryptcephalus nitidulus*, Gyll., and *C. coryli*, L., taken at Box Hill during Whitsun. He also exhibited two very rosy males of *Smerinthus populi*, L., which had been attracted by a female placed on some ferns growing in his garden. This female was one of a second brood of 1893, of which several had emerged this year. The original pair were taken *in cōp.* in April. From these he had bred imagines in July, and from these again some had been bred in September, while others remained over.

Mr. Filer exhibited a long series of *Smerinthus populi*, L., bred from one batch of ova. One of the males was distinctly of the female coloration. All but one specimen emerged this season, and that one came out on August 6th, 1893. Mr. Adkin was pleased to note the partial autumnal emergence of this species and said that it confirmed what Mr. Barrett had stated some time ago. He observed, too, that the discoidal spot on the primaries of the specimen bred in August was much smaller and less white than in any of those which remained over.

Mr. Turner exhibited a bred series of *Cymatophora ridens*, Fb., from the New Forest, and a larva of the same species; also a pupa of *Melitia aurinia*, Rott.=*artemis*, Fb.

Mr. Step exhibited a series of *Helix rufescens*, Penn., *Lymnæa peregra*, Müll., var. *acuminata*, Jeff., from Epsom, a var. more beautiful than the type; and an ovum of *Helix pomatia*, L., which had been side blown, one of a large number taken during the Society's Field Meeting at Reigate on June 9th. He said that there was a considerable amount of calcareous matter in the shell which rendered it capable of retaining its form when blown. *Helix pomatia* scraped, by means of the contraction of its foot and the edge of its shell,



Early Stages of Osmunda regalis

NOTES—

The actual sizes of the specimens from which these figures were sketched is indicated by the vertical line beside each. No. 1 is the earliest form of the prothallium; No. 2: As growth proceeds the frontal sinus becomes deeper and wider; No. 3: By the growth of the two lobes a similar sinus is formed behind, with a bending up of its margin; No. 4: The first indication of a frond, protruding from the underside; No. 5: Underside about same period as No. 4, showing frond; No. 6: Reduced figure with first frond expanded; No. 7: With two fronds: plant about eight months old.

considerable cavity in the soft earth. Here it deposited its eggs to the number of about thirty. Then it roofed them over with earth, agglutinated by its slime, leaving only a small hole, presumably for the exit of the young molluscs. He remarked upon the retiring habits of the young, for he had never yet found a juvenile specimen of this species. Mr. Winkley confirmed Mr. Step's observations, and said that some he had taken had laid their eggs. The animals were feeding readily on rhubarb, and he had seen three *in cœp* together. Mr. Step said that it was no unusual occurrence to see a whole chain together at the same time, and that each specimen produced ova for the species was a true hermaphrodite.

Mr. Step then exhibited the early stages of growth of *Osmunda regalis*, L., with a series of enlarged drawings, and stated that the prothallium differed considerably in form from Goebel's figure in Bennett and Murray's "Cryptogamic Botany," which he believed was sketched from an exotic species of *Osmunda*, although there described as *O. regalis*. Some time ago Mr. Carrington had given him a sheet of compressed peat, which it was proposed to use as a substitute for cabinet cork. This he had soaked for some time, and then held under the fertile fronds of the *Osmunda* to catch the falling spores. It was then placed in a fern case, with a seed pan filled with water, and relegated to a cold greenhouse. The peat was laid sloping and kept moist, but the moisture not allowed to get stagnant. In time the surface became green, and the prothalli appeared, gradually growing, and producing minute fronds in the spring. He showed all the stages of growth, and said that the earlier by no means resembled the mature fronds. For comparison he had also brought the prothallium and young fronds of the hartstongue (*Scolopendrium vulgare*, Sm.), which, he pointed out, showed a considerably closer resemblance to the adult. He thought that this difference in the amount of resemblance was explained by supposing that the *Osmunda* was a much more highly developed cryptogam than the hartstongue, which had not proceeded so far along the evolutionary lines.

Mr. Turner read a report of the Field Meeting at Reigate on June 9th (page 86).

JUNE 28th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. A. G. Scorer, of Abercorn Lodge, Upper Hamilton Terrace, N.W., was elected a member.

Mr. C. Fenn exhibited a bred series of *Geometra papilionaria*, L., and remarked that two larvæ of the brood were still not full grown; a specimen of *Heliothis peltigera*, Schiff., taken in his own garden at Lee on the evening of June 4th round the blossoms of the sweet rocket; and he also exhibited a very long series of *Selenia lunaria*, Schiff., bred from one batch of ova, and read the following notes:—

“In May, 1893, I captured a female example of *Selenia lunaria* at Bexley. She deposited a good batch of eggs, which duly hatched, and the larvæ fed up on birch. In August (1893) nineteen individuals emerged, of these eighteen were females and one male. Two females were bred in November and another in December. The spring brood commenced to appear in April, 1894. The first twenty bred were females, but among the forty which subsequently emerged the sexes were evenly distributed. The summer or August brood (*delunaria*) is very distinct in colour from the spring emergence, but the occurrence of an example of the summer form among the spring brood is rather suggestive that the summer brood is only an occasional occurrence, and has originated in recent times. I may add that I bred a dark female this year among the pale August specimens.”

Mr. Robert Adkin exhibited the following Lepidoptera, taken at Reigate on the occasion of the Society's Field Meeting on June 9th:—

Lycæna icarus, Rott., a variety of the underside of the male, in which the black spots are much reduced in size, and those near the base of the fore-wings absent; *Lycæna bellargus*, Rott., blue varieties of the female; *Pachetra leucophæa*, View., a female example that was taken at rest on the side of a chalky bank; and an unusually large dark specimen of *Oncocera ahenella*, Zinck.

Mr. Dennis exhibited some ova and young larvæ of *Bombyx rubi*, L., which he had taken at the Society's Field Meeting at Reigate. A discussion ensued as to the difficulty of rearing the species, several members had always been unsuccessful, while others had bred but a very small percentage. It was remarked that the larvæ did not feed at all after hibernation.

Mr. Manger exhibited a fine specimen of "British coral" *Lepralis foliacea*, El. and Sol., taken from a portion of the French Atlantic Cable at a depth of sixty fathoms, about sixty-five miles from Brest. He understood the cable had been laid about fifteen years.

Mr. Turner exhibited a long series of *Lycæna bellargus*, Rott., taken at Ranmore Common, very many of the females shown possessing a considerable area of the male coloration on the upper surface of their wings.

JULY 12th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. Winkley exhibited young specimens of *Helix pomatia*, L., which had recently hatched from the eggs taken during the Society's Field Meeting at Reigate on June 9th. He said that the eggs were placed under damp earth in a glass jar, and exposed to the weather, where they could be under the influence of rain and yet not swamped. On July 6th, when they had been deposited about a month, they changed colour, becoming whiter and more opaque. The skin of the egg cracked on the following day, and on the third day the young were free. In the course of a day or two more they attached themselves to lettuce and rhubarb leaves, and commenced to feed. Mr. Step was pleased to see the young of this species for the first time, and read a letter which he had just received from Miss Hele of Bristol, who had bred this mollusc for many years. She stated that about seventy eggs were laid in a batch; that growth took place above the soil on the leaves. She was not successful in keeping them more than three years, and they seldom reached the size of a walnut. At the end of two years the thick lip was formed. Mr. Winkley thought that if supplied with abundance of lime they would have much more favourable conditions. Mr. Carrington said that he had a communication from Lincoln, from a gentleman who had a long experience in keeping species of this genus in captivity. He had informed him that no member of the genus *Helix* retired below the soil to increase the size of its shell. They generally got under the leaves in the shade after having fed very voraciously for a short time previously. Here they formed a thin semi-transparent film of the full extent of the new growth, and inside this the deposit went on steadily, the shell increasing in thickness, not in length. Mr. Carrington considered that chalky soil supplied to this animal would have no effect

whatever on its growth. It was strictly herbivorous, and its alimentary canal much too delicate to digest earth. Lime could only be of use to it when it had been absorbed and assimilated by plants grown on a chalky soil. He thought that the notion of these creatures burrowing for growth was now fully exploded. Mr. Step remarked that the excrement of the animals invariably showed remnants of the food. That of *Helix pomatia* gave no evidence of soil having been absorbed by it. He had fed the species on flour, and the excrement was perfectly white instead of the usual green colour, the whole of the flour not being taken into the system.

Mr. R. Adkin exhibited a series of *Dianthæcia nana*, Rott., bred this spring from Shetland (Unst) larvæ; the specimens were all very dark, some being of a unicolorous blackish grey; also a yellow-banded example of *Sesia myopiiformis*, Bork., taken by Mr. Wellman some few years since at Brixton, and remarked upon the red bands of the *Sesiidæ* occasionally assuming the yellow coloration.

Mr. Oldham exhibited series of several species he had bred from Epping Forest, also examples of other species taken during the Society's Field Meeting at Wisley. Mr. Adkin called attention to a specimen of *R. crategata*, in which there was a well-developed waved transverse line on all the wings, and remarked that he considered this to be most unusual.

Mr. Dennis exhibited two curious examples of *Epinepheliana*, L.; one had a ring of dark brown, $\frac{3}{16}$ inch in diameter on under side of left hind-wing, the centre filled up with the ground colour, captured in the New Forest in July, 1894. The other specimen, which was taken at Folkestone in July, 1885, had the fore-wings bone colour, except a thin line along the costa and a broader irregular border along the outer and inner margins, which were of the ordinary colour; the usual apical ocellus was absent; hind-wings with a crescent-shaped patch of bone colour along costal and outer margins, occupying about a third of the wing.

Mr. Auld exhibited a long-bred series of *Phorodesma smaragdaria*, Fb., from Essex. One specimen was without the lighter markings, having only the white discoidal spots.

Mr. C. A. Briggs exhibited a specimen of the rare lace-wing fly, *Nothochrysa capitata*, Fb., taken at Wisley on June 22nd, and stated that only nine specimens had been recorded as taken in this country during thirty years.

Mr. Winkley exhibited some fossil wood which he had obtained from Shanklin, and a large fossil shell studded with

metallic particles; also a fossil oyster, showing both valves complete, obtained from the interior of Australia, about 600 miles from the coast, by Mr. Wollaston.

Mr. Edwards exhibited two specimens of the rare *Ornithoptera cræsus*, Wall., from the island of Batchian, in the Northern Moluccas. This magnificent species was first discovered by Mr. A. R. Wallace, and its capture was described in glowing terms in his book the "Malay Archipelago," also a female *Papilio gyas*, Wstw., from India.

Mr. Perks exhibited the eggs of a *Coccinella*, one of which was laid on the point of a thorn; also a specimen of *Sedum reflexum*, L., found by the roadside at Wisley.

Mr. Hall exhibited specimens of *Drosera rotundifolia*, L., and *D. intermedia*, Hayne, found at Wisley, and stated that he had not seen the latter species before. Mr. Step said that there were three closely-allied species, the most marked difference between them, besides the shape of the leaves, being the arrangement of the leaves. In *D. rotundifolia* the leaves were appressed close to the soil, in *D. intermedia* they were at about an angle of 45° with the ground, while in *D. anglica*, Huds., which was rare, especially in the South of England, the leaves were erect. He suggested as a reason for this variation in habit that the first-named species caught creeping insects, whilst the other species catches those that flit across the low vegetation. *D. rotundifolia* had its flowers on a long thin stem, while *D. intermedia* produced a short thick flower stem. These species were seldom seen with the flowers quite open, as this only happened in the brightest sunshine during the middle of the day. As regards the phylogeny of the three species he would suggest that *D. rotundifolia* was the older form, and *D. intermedia* and *D. anglica* the derived species, for among the very young seedlings of *D. intermedia* a considerable proportion had round leaves, the newer growths gradually becoming spatulate. He said that these three were not the only British fly-catching plants, as in the North there occurred the butterwort (*Pinguicula vulgaris*, L.). Mr. Carrington said he had seen the butterwort growing on some of the Northern mosses. Its leaves were larger, thicker and broader than those of the *Drosera*. They did not fold over, but exuded a greasy sticky slime, which was the real trap. Midges were the kind of insects chiefly caught. The *Pinguicula* was common on some of the moors of the Southern highlands, its leaves were spread out flat, the flower stem was tall and bore not more than two flowers—often only one—very much like a violet bloom in general appearance. He

also said there was an Irish form much larger and finer in growth (*P. grandiflora*, Lamk.). Mr. Briggs said that the butterwort was found in Worcestershire.

Mr. Step exhibited specimens of the dropwort (*Spiræa filipendula*, L.), which is at the present time so conspicuous with its white flowers on the Downs; it was formerly supposed to be the food plant of the larvæ of *Zygæna filipendulæ*, L. He also brought for exhibition buds and flowers of the musk thistle (*Carduus nutans*, L.). The odour of musk was not very apparent. He drew attention to the web of hairs which overspread the involucre.

Mr. Rice exhibited the "cock's nest" of a wren (*Troglodytes parvulus*, Koch.), built among a mass of flowering honeysuckle, taken at Wisley during the Field Meeting on July 7th. Also for comparison a nest built in a furze bush, and an ordinary nest lined for incubation. He also exhibited the four eggs of a bullfinch (*Pyrrhula europæa* V.), taken on that occasion.

Mr. Turner exhibited a short series of *Lycæna minima*, Fues., taken by Mr. Allen in Galway. Six specimens showed undersides, and formed a graduated series from one with a full set of well developed spots to one with only a trace of markings beside the discoidal spots on the upper wings. He also showed the specimen of *Lycæna astrarche*, Bgstr., taken at Reigate on June 9th, in which all the central portions of the primaries were suffused with a rich brown colour; and an asymmetrical specimen of *Smerinthus tilia*, L., taken at Greenwich, in which the right side was of a deep green and a rich ferruginous brown, while the left side was of a much paler green and brown, the latter part being smoky in places, at the same time the lower of the two blotches on the left fore-wing was very narrow, the corresponding one on the right side being large.

Mr. West (Streatham) said that he had found the blooms of *Syringa* exceedingly attractive to the Clearwings, as he had taken no less than six dozen *Sesia tipuliformis*, Clerck., which had come to the flowers. Privet, which was generally said to be very attractive to this species, was in bloom near, but had failed to attract a single specimen. Both Mr. Adkin and Mr. Carrington stated that they had found privet bloom to be very attractive to *S. tipuliformis*, the latter gentleman stating that the only living specimen of *S. andreniformis*, Lasp., he ever saw was at the flowers of privet.

Mr. Tugwell communicated that three specimens of *Hydrilla palustris*, Hb., had been captured at Wicken Fen during the past June by Mr. A. J. Hodges.

Mr. Turner read the report of the Field Meeting at Wisley on July 7th (page 87).

In referring to the Wisley Meeting, and proposing a vote of thanks to Messrs. Step and Briggs, Mr. Adkin said that the district, being quite new to him was most interesting on that account, although apparently not a lepidopterous locality. Mr. Carrington, in seconding the vote of thanks, said that changes were generally productive of good, something unusual being brought before us; our observations and thoughts were often directed into other channels. The Bagshot sand series of formations, of which Wisley was formed, seemed peculiarly unsuitable to the production of lepidoptera and terrestrial mollusca. This, no doubt, was influenced in the one case by the limited flora and in the other by the small amount of calcareous matter present in the soil. On the other hand there were few districts so rich in the various species of Neuroptera, as had been well proved by Mr. Briggs.

JULY 26th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. Frohawk exhibited a bred series of *Melitaea cinxia*, L., consisting of ten males and thirty females, all set to show the underside. There was much variation both in depth of colour and markings, especially in the extent of the black spots on the median light band, one male having them so enlarged as to form oblong black blotches. No two specimens out of the forty were exactly similar. Many of the females had the ground colour of the secondaries primrose yellow, others were white; the yellow in some being quite as well developed as in the males.

Mr. Hall exhibited a very variable series of *Melanippe hastata*, L., from Sheffield, Scotland and the Hebrides; in some specimens the white median band was complete, while in others it was almost obliterated by the expansion and development of the black markings.

Mr. Carpenter exhibited a bleached variety of *Epinephele ianira*, L., taken in the New Forest. The pale portions of the insect were on the secondaries, and consisted of a large circular blotch on the hind margin of each wing with a number of oblong clouds, more or less apparent, radiating from the base. He stated that this was the only specimen worthy of remark that a fortnight's work had produced in the above locality. Every species was comparatively scarce, more especially when compared with last year's abundance.

Argynnis paphia, L., was rare, and not a single white spotted male was taken, while only seven var. *valesina*, Esp., had been captured by him. *Limenitis sibylla*, L., was in numbers about the average, but *Argynnis adippe*, L., was decidedly scarce. Sugar had been a total failure. Mr. Auld said that his experience was similar to that of Mr. Carpenter.

Mr. Robson exhibited a short series of *Macroglossa bombylifformis*, Och., from the New Forest, taken on May 15th. Mr. Hall remarked that he never captured this species with the scales intact on the wings, but had bred it with wings quite opaque. Mr. Adkin said that soon after emergence the insect seemed to shake these loosely attached scales from its wings, so that it was necessary to kill it at once. Mr. Carpenter referred to its habit of getting well into the bushes and undergrowth, as no doubt aiding in the quick disappearance of the surface scales.

Mr. Robert Adkin exhibited a series of *Coccyx strobilella*, L., together with the spruce cones from which they had been reared and read the following note:—"In the spring of this year I received four 'cones' taken from the top branches of a spruce tree that had been felled in the New Forest. I was uncertain at the time that I received them to what species the larvæ infesting them were referable, and so put them away in a glass cylinder where I might be able to observe what took place. Shortly some small Diptera appeared, followed soon after by the moths, accompanied by a host of Ichneumons. In all I must have bred some three or four dozen moths from the four cones and many times that number of flies of one sort and another. I have always understood that the larva of *strobilella* feeds upon the seeds, and a dissection of the cones leads me to think that this is correct, but the woody core of the cone is also much eaten, whether by this larva or by those of some of the other insects produced from the cones I am unable to determine, but the position of the empty pupa skins when the cones were taken to pieces, and the workings in the immediate neighbourhood, lead me to conclude that the larva of *strobilella* eats some of the woody parts as well as the seeds.

"An interesting feature in the economy of the species is the retention of the pupa among the scales of the cones. The seeds having ripened, the scales open to admit of their falling out, and are thenceforward continually opening and closing according to the dryness or dampness of the atmosphere. To guard against the pupa dropping out of the cone the larva appears to eat a small hole into the underside of one of

the scales, and to attach the tail of the pupa to the eaten portion in such a manner that the head points in an upward direction and towards the outer edge of the scale, as will be seen by the pupa *in situ* on the detached scale now exhibited. This arrangement appears to answer the double purpose of keeping the pupa from falling out of the cone and protecting it from undue moisture, as rain falling on the scales would run down their front or upper surfaces and they would thus form roofs for the pupa attached to their back or under surfaces."

Mr. Step said that no doubt the cones were hygroscopic, the scales closing in damp weather and only opening during dry and high winds, thus affording the seeds the greatest chance of being carried far from the parent tree. The insect in acquiring its protective characteristics had adapted itself to the circumstances of its existence in its early stages. He also thought that if a seed were attacked before it was ripe, by a larva, it would not fall, and probably the scales would not open.

Mr. H. Moore exhibited a number of fossil shark's teeth, taken from a cargo of guano which had been brought from Bull River, South America. It was supposed that the guano was obtained from a coprolite bed.

Mr. Harrison exhibited and presented to the Society three photographic views of Boldermere, taken by himself during the Society's visit to Wisley on July 7th. Mr. Step hoped that this innovation would be followed up; and it was suggested that an album be obtained to contain such mementos.

Mr. Robert Adkin read the following communication from Mr. South concerning the dipterous larvæ in reeds, exhibited on March 22nd, 1894:

"A few months ago I exhibited some swollen stems of *Phragmites communis*, Trin. (*Arundo phragmites*), each containing a large dipterous larva, which I was then unable to identify. Several letters concerning these infested reeds have been received, and there appears to be little doubt that the larvæ in them were those of *Lipara lucens*, Mg.

"The Rev. E. N. Bloomfield, Guestling Rectory, Hastings, writes to me as follows:—'I see that on March 22nd you exhibited some "heads" of *Arundo phragmites* infested by a large dipterous larva. Doubtless these were the larvæ of *Lipara lucens*. Last year Mr. E. A. Butler sent me specimens of the infested shoots, and of the insects bred from them. He found them in plenty at Pevensy, and also at Bexhill. *Lipara lucens*, Mg., belongs to the family of the Chloropidæ,

and hence is nearly related to the corn pests of the genera *Chlorops* and *Oscinis*, but it is very much larger than these latter flies. I don't think it is mentioned by Walker, but it must have been known as a British species for more than thirty years.' Mr. C. W. Dale mentions that he has specimens 'bred from reeds by Winter in 1861.' Mr. Verrall says, 'The swollen reeds are well known to me, and many years ago I bred *Lipara lucens* from them.'"

Mr. Adkin remarked upon the large number of *Acidalia virgularia*, Hb. (*incanaria*, Hb.), that were now to be seen in his suburban garden, while species which were so abundant last year, such as *Spilosoma lubricipeda*, Esp., *S. menthastris*, Esp., and *Euplexia lucipara*, L., were correspondingly scarce. Several members, including Mr. Hall and Mr. Jäger, said that their observation of these species this year agreed with that of Mr. Adkin.

Mr. Frohawk stated that the larvæ of both *Vanessa atalanta*, L., and *V. cardui*, L., were common, and Mr. Hall had already taken the latter species freshly emerged.

Several members, including Messrs. Frohawk, Adkin, and Step, referred to the fact that blackbirds and thrushes were still in full song, and remarked that this was unusually late.

Mr. Step said that myriads of a small red fungus had appeared upon the ceiling of his dining-room at Epsom. He had submitted it to Mr. Phillips, the best authority on these smaller fungi, and he stated it to be a very uncommon species, *Peziza hæmastigma*, Hedw., which was somewhat similar to *Peziza domestica*, Sow., a species commonly occurring on damp walls.

AUGUST 9th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. A. W. Peach, of 9, Holly Road, Chiswick, S.W., was elected a member.

Mr. T. W. Hall exhibited a bred and variable series of *Xanthia fulvago*, L. (*cerago*, Fb.), from Derby and Croydon, among them being var. *flavescens*, Esp., and several forms intermediate between that form and the type. He stated that in his experience of this species the var. *flavescens* was more commonly obtained in the North of England than in the South; in fact, he had bred only isolated specimens from the latter district, while from the former he had obtained a considerable percentage of this form. Mr. Turner had bred the type from a number of southern localities, but had failed

to obtain a single specimen of the var. Mr. R. Adkin said that from Forres larvæ he had received nearly 50 per cent. of the var., while from several other parts of Scotland he had only obtained a few, and very few indeed from South of England districts. Mr. Hall also exhibited a bred series of *Xanthua citrigo*, L., in which the darker transverse markings varied very considerably, one or two specimens being of nearly uniform coloration, while in some the darker colour was very intense.

Mr. West (of Streatham) exhibited two males and two females of *Lasiocampa quercifolia*, L., bred from larvæ taken in Herefordshire, and fed upon apple leaves.

Mr. Adkin remarked that some time ago a report was current that the larvæ of this species was doing great damage in one of the Midland Counties, and Mr. South wrote and endeavoured to obtain as many as possible. Less than two dozen larvæ were forwarded to him, but the sender said that if earlier application had been made for them he could have sent a good number. They had been destroyed as soon as found, as they were considered highly destructive to young apple trees.

Mr. Adkin, on behalf of Mr. South, exhibited series of the following species:—

Cleoceris viminalis, Fb., a selection from about thirty specimens bred from larvæ collected at Batchworth, in Herts. The larvæ were feeding in rolled leaves at the ends of the twigs of willow in May and June, and the moths were bred in July. Some examples were exceptionally dark for southern specimens, and somewhat approached the well-known melanic race from the Sheffield district, whilst the palest specimens were lighter than usual.

Scoparia murana, Curt., a series collected this year around Macclesfield, which well illustrated the variation of the species in that district, as the specimens comprised therein had been selected from about 130 examples collected from the old stone walls in and about the town. The majority of the specimens were, however, from the walls on the west of the town, at an elevation of about 600 feet above the sea level.

Prays curtisellus, Don., a series comprising both the normal and fuscous forms collected around Macclesfield. The typical forms appeared to be the commonest, but this may have been due to the fact that it is a more conspicuous insect when at rest, and its detection, therefore, more easy.

Mr. Croker exhibited two specimens of *Leptogramma*

literana, L., from the New Forest, one being very much suffused with black markings and having the Y-shaped streak from the base brown in colour, while the other specimen had fewer black markings, with the streak of a red colour.

Mr. R. Adkin exhibited a series of *Spilosoma mendica*, Clerck., bred from ova received from Mr. Robson, of Hartlepool, and somewhat heavily spotted, especially the females, but otherwise closely resembling the usual southern type.

Mr. Williams exhibited a specimen of *Uropteryx sambucata*, Dup., taken at Highgate, having the spaces between the wing rays of the right upper wing curiously suffused with brown for some distance from the margin. He suggested that the change in colour was due to the wing having been scorched. Mr. Hall remarked that nearly all yellows were susceptible of a similar change when acted on by acids or by heat. Mr. Adkin had seen *Rumia luteolata*, L., scorched somewhat in the same manner, but in this case the wings were symmetrically seared, and thus a beautiful specimen was formed.

Mr. Turner exhibited a very dark specimen of *Melanippe fluctuata*, L., referable to var. *neapolisata*, Mill., captured in his garden at Brockley; also a short series of *Melitæa aurinia*, Rott. (*artemis*, Fb.), bred from larvæ obtained from Penarth, one of the specimens, a female, being very large.

AUGUST 23rd, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. A. Hall exhibited a number of *Diurni*, captured in Switzerland during a fortnight at the end of July and beginning of August. The collection comprised about 100 species, some being from an altitude of 11,000 feet. Mr. Barrett, remarked upon the interesting nature of this exhibition, and stated that butterflies were as abundant in the higher regions of Switzerland as in the valleys. In connection with this exhibit, Mr. Dennis pointed out that the two specimens labelled as *Hesperia thaumas*, Hufn., were *H. lineola*, O.; and upon closer examination all doubt was removed, the black tips to their antennæ at once identifying them.

Mr. Filer exhibited a very dark specimen of *Stauropus fagi*, L., from Ashdown Forest, together with a normal one for comparison. Mr. Barrett said the black one was well worthy of notice, especially as the first and second transverse lines were very light.

The Rev. J. E. Tarbat exhibited a remarkable aberration

of *Vanessa cardui*, L., from North Wales (figured *Entom.* xxvii. 277).

Mr. Mera exhibited *Agrotis tritici*, L., and *A. aquilina*, Hb., and remarked that the latter was supposed by some to be a variety of the former. In the course of a discussion which followed, Mr. Barrett said he was disposed to think that they were distinct species, though Mr. Fenn inclined to the opposite view.

Mr. Frohawk exhibited pupæ of *Vanessa urticæ*, L., showing great variation in colour. One specimen, which had the entire surface beautifully gilded, was produced by the larva pupating in a high light on white china; another, uniformly blackish without any gold, had pupated on zinc in dull light with about 150 others, all of similar dull colouring. An intermediate form of light pink ground colour, marked with pale olive and partially marked with gold, had pupated in a subdued light on faded pale greenish gauze.

Mr. Sauzé showed males, females, and neuters of *Formica nigra*, and read a note thereon, also remarking upon their extreme abundance during the last few days.

Mr. Step exhibited, on behalf of Mr. H. J. Barber of Brighouse, Yorkshire, a young newt that had not yet lost its branchiæ. It somewhat resembled *Triton cristatus*, but had on each leg, at its junction with the body, a pronounced yellow patch. Mr. Step was of opinion that it was the young form of *Salamandra maculosa*, a Continental species accidentally introduced here.

SEPTEMBER 13th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. R. Adkin exhibited, on behalf of Mr. R. South, a series of *Peronea variegana*, Schiff., recently taken in the Macclesfield district. The series comprised all the named forms with the exception of var. *albana*, Westw., a form which Mr. South had met with only in Durham. The type, var. *asperana*, Fb. (basal half white), and var. *cirrana*, Curt. (bluish or brownish-grey), occurred in about equal numbers, and the latter var., it was stated, Mr. South had not met with elsewhere, and it would be interesting to have information concerning the British distribution of this form.

Mr. R. Adkin exhibited, on behalf of Mr. H. Murray of Carnforth, a variety of *Erebia æthiops*, Esp. (*blandina*, Fb.) in which the ground of the left forewing was almost completely bleached. The specimen was taken near Carnforth on August 10th last (figured *Entom.* xxvii. 301).

Mr. R. Adkin also exhibited a branch of the rare star-thistle (*Centaurea calcitrapa*, L.), which he had recently gathered on the Downs near Eastbourne, where in one particular spot it was growing in considerable profusion. Mr. Step, referring to *Centaurea solstitialis*, remarked that it was an introduced species, whose native habitat was the Mediterranean region.

Mr. Barrett exhibited the specimen of *Plusia moneta*, Fb., taken at Norwich by Mr. Tillett, and also a beautiful red variety of *Oncocera ahenella*, Zinck, taken by Mr. Purdey at Folkestone.

Mr. Filer exhibited series of *Epinephale hyperanthes*, L., from Brockenhurst and Halstead, the latter series showing a general tendency to the obliteration of one or two spots on the undersides of the secondaries.

Mr. H. Moore exhibited living male and female specimens of *Ephippigera vitium*, and read the following note:—"This species, the 'saddled-leaf cricket of the vine,' appears in South Europe from August to October among bushes, etc., near vineyards. At Le Clain, near Poitiers, we found a considerable number in the road. They had evidently been dislodged by the recent heavy rain. When on the ground their movements are sluggish and their hop feeble; but amidst the herbage they make good progress and climb freely. The males were greatly in the majority, only a few females being seen. The male chirps twice and the female once. The live male exhibited was boxed on August 25th, and since my return home has been fed on knot grass (*Polygonum aviculare*). This orthopteron is called by the peasantry the 'Lindi.'" These specimens were set free upon the table, and the sexual difference in the chirp of the male and female was very noticeable. Mr. Moore further remarked that north of the Seine during August lepidoptera were exceedingly scarce, and not until he passed across the Loire was there any abundance of insects. In the south of France *Colias edusa*, Fb., was very common, while at every patch of dung along the road *Lycæna icarus*, Rott., simply swarmed, rising up in clouds as the party rode through them. There seemed to be a great preponderance of males everywhere. Locally *L. corydon*, Fb., was plentiful, and he had the pleasure of taking a beautiful variety of the female with blue upper wings.

Mr. A. Hall exhibited a specimen of *Pyrameis myrinna*, Dbl., with a remarkable variety of the same species from Bogota in South America. In this example the upper side

is rather lighter in colour than normal specimens. The dark median band is entirely absent from the fore-wings, and the outer series of white apical spots are suffused over the whole apical area in the form of long grey streaks; the inner series of spots is absent. On the hind-wings the dark median band is unusually narrow, but much suffused; and there is no blue spot at the anal angle. On the under surface the fore-wings are without any of the usual markings, the apical area being uniform pale grey. The hind-wings beneath are normal, but much suffused.

Mr. Manger exhibited a specimen of the rare stalk-eyed crustacean, *Gonoplax angulata*, which had been dredged off Weymouth. The eye stalks of this species are remarkable for their length as are also the anterior pair of legs.

Mr. Step exhibited several specimens of *Polyporus perennis*, Fr., from Oxshott, which very plainly showed the habit of growing around objects and enclosing them rather than taking a fresh direction for growth.

Mr. R. Adkin exhibited eight specimens of *Arctia caia*, L., bred from an equal number of larvæ picked up in his garden at Lewisham at different times during the past spring. He said the series was not shown as representing any strongly marked varieties, for the whole of the specimens were very uniform in pattern, but rather to illustrate sundry minor points of variation. In the first place, while the ground-colour of the fore-wings was in some of the specimens almost white, in others it had a decided brownish tinge, very similar in tone to that of some specimens exhibited by Mr. South at a previous meeting ("Proc. S.L.E. and N.H.S.," 1892-3, p. 28), which had been artificially coloured by being killed with nicotine. In the present case no such expedient had been resorted to, the whole eight insects having been dealt with under equal conditions, and killed in the "cyanide bottle." Another point of variation was in the colour of the hind-wings. This in some was a brilliant red, and in others a decided orange colour; the fringe of the hind-wings also showed considerable modification of coloration, being in one case completely pale yellow, while in another it was dark brown for about half its length, and he further said that although he had a considerable number of this species in his collection, there was not one among them in which this brown colour was carried so far round the wings as in this last mentioned specimen.

Mr. West (of Greenwich) exhibited a specimen of the rare coleopteron *Lebia cyanocephala*, L., taken by himself at

Bookham, with specimens of the two races of *L. chlorocephala*, Hoff., from Purley and Plumstead for comparison.

Mr. Tutt gave a lengthy and interesting account of what had been seen by Dr. Chapman and himself during a holiday tour in the Upper Dora and Cogne Valleys in Piedmont. He said that the main object of his journey was to see the rarer British species of Rhopalocera in their really native haunts. In this object he had been most successful for *Carterocephalus palæmon*, Pall., and *Thecla pruni* were perhaps the only species he had not now seen, the rest being in one place or another absolutely in profusion. A most remarkable circumstance to him was that so many species should be out at one and the same time, some species seemed to have a continuous brood lasting throughout the summer and not to emerge at a definite period as in our own northern clime. In one valley alone, quite a hundred species of butterflies could probably have been taken. *Papilio podalirius*, L., was commonly observed at pools in the road, and wherever there was moisture of any kind, even in the shade, there insects swarmed. During the whole month he was away, he experienced no wet, the weather was simply glorious and most propitious for insect life. In a valley at the base of Mont Blanc, the genus *Erebia* was most abundant, but he only saw two fine specimens of *Erebia æthiops*, Esp. To call some of the *Erebias* "browns" was certainly a misnomer, many species being most elegantly shot with iridescent colours. *Parnassius apollo*, L., was in abundance on all the alpine slopes. The larvæ of *Papilio machaon*, L., occurred now and again, and imagines were occasionally seen. The "hedges" were low walls of stone, which had become covered with a close growth of saxifrage, and this, when in blossom, formed one of the best natural attractions for insects which he had ever seen. *Gonopteryx rhamni*, L., was common, and Dr. Chapman also saw specimens of *G. cleopatra*, L. in Savoy. The "whites" were excessively abundant, *Pieris daphidice*, L., being common in many places, especially in the Aosta valley. It was certainly most conspicuous on the wing, and he failed to understand how an ordinary observer could for a moment confuse this species with any other "white" when flying. The higher slopes of the mountains were the haunts of innumerable imagines of the genera *Argynnis* and *Erebia*. In the Cogne Valley *A. paphia*, L., was taken together with a very fine specimen of the var. *valesina*, Esp. *A. niobe*, L., was in enormous quantities, but very local. He noticed all the British species of *Meletæa*, including *M. cinxia*, L., and

on Mont de la Saxe occurred dwarfed alpine forms of many other species, pale and deficient in pigment, no doubt the result of the sparse food and the difficulties of existence at a high altitude. At Aix, in one restricted locality, he saw specimens of *Nemeobius lucina*, L., *Colias edusa*, Fb., *C. hyale*, L., and *Acidalia ochrata*, Scop. It was interesting to note the predominant species of the same genus at different altitudes, for instance, the genus *Colias*: at very low levels *C. edusa*, Fab., predominated, up to the pine region *C. hyale*, L., prevailed, throughout the pine zone *C. phicomone*, Esp., was most conspicuous, whilst above the pines *C. palæno*, L., outnumbered the others. The *Lycænidae* were seen everywhere, but if specimens were wanted they could best be selected from the countless numbers which drank the moisture at the manure heaps attached to every châlet. *Lycæna arion*, L., and *L. semiargus*, Rott. (*acis*, Schiff.) were only found locally but in fine condition. The *Hipparchias* were simply magnificent, and only comparable in their flight to *Apatura iris*, L., most of them being shot with purple. The *Hesperidae* were by no means behind the other families in numbers. *Nisoniades tages*, L., was seen apparently just emerged, while at an elevation of 5,000 feet, *Hesperia thaumas*, Hufn., *H. sylvanus*, Esp., and *H. lineola*, Ochs., were flying together. It was remarkable that the last species was in our own country confined to districts scarcely elevated above the sea level. In a few places near Cogne the willows were almost denuded of leaves from the attacks of the larvæ of *Vanessa antiopa*, L. On one mountain slope near Courmayeur in a particularly favourable locality he saw no less than seven species of *Zygænidae* flying together, and took especial care in observing whether the species crossed with each other, but although he noticed many pairs *in cop.*, yet in every instance he saw these closely allied species only pairing with their own species. *Zygæna exulans*, Hoch., was common in the Lauzon and Grauson valleys, which are parts of a wild district where ibex and chamois are preserved by the King of Italy. There, flying together, were some bright streaked forms with pale nervures, and the form which some entomologists thought peculiar to our Scotch mountains. Of *Setina irrorella*, Clerck., he should think he saw all possible variations from specimens with the normal number of spots, through the IVI form, to forms with black lines extending from the base to the outer margin of the wing, and all intermediate variations. He was very familiar with the *pygmæola* form of *Lithosia lutarella*, L., at Deal, but the golden tint of the type form

in the Aosta valley was strikingly beautiful. It was really remarkable what effect abundance of food and sufficient heat could have on a species. The name *lutarella* was very appropriate.

In the discussion which followed Mr. Barrett said that very frequently heat meant dryness of air, and that insects would be attracted by moisture of any description. Mr. Moore corroborated Mr. Tutt's remarks as to the abundance of butterflies, but said that the air was by no means dry. Mr. Mansbridge, who had just returned from a stay in the Indian Territory, U.S.A., said that his experience of *Rhopalocera* seeking moisture was very similar, and there, although the temperature in the sun was from 95° to 110° , yet the air was moist. He had also observed insects appearing in a constant succession of broods throughout the summer from May to September. At a later date he would communicate his observations to the Society, and illustrate them with the insects he had collected.

SEPTEMBER 27th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. Auld exhibited a larva of *Phorodesma smaragdaria*, Fb., which had been feeding fourteen months. In July, 1893, he had taken a number of the larvæ of this species, and of these three had gone on feeding beyond the usual time of pupation. One of these three died in the beginning of September, the second, after spinning a cocoon, died during the third week of September, and the third was now exhibited. It was somewhat darker in colour than those of the present year, but to all appearances healthy. He thought the circumstance was most remarkable, and he was aware of no similar instance of prolongation of the larval stage. The whole of the larvæ had been kept outdoors on the growing plants, and exposed to the full influence of the weather. The mortality among them was somewhat large.

Mr. Jäger exhibited a long series of *Callimorpha hera*, L., including those he had taken during August in South Devon, while working in company with Mr. H. Robson and Mr. Porritt, and communicated the following note:—

“Nearly the whole of our specimens were beaten out of hedges bordering lanes and roads during August, but we ascertained that their first natural flight occurs at dusk, when we captured some flying in a garden round flowers, after the manner of a hawk moth. The red normal form proved the

most abundant this year, which differs from my experience in former years, when the var. *lutescens* was always the most common. Those of my exhibits of the orange or terra cotta tint were by far the rarest. They are probably the offspring of red and yellow parents. We only saw one or two flying in the sunshine, which might have been from their own choice, or it may be that they were simply disturbed by the shifting of the sun's rays or a shadow, as they are exceedingly shy. They always sit on the sunny side of a hedge or lane. In Germany they fly by day, and are frequently to be seen sunning themselves on thistle heads. They are attracted by light, and probably have another flight after midnight, for a signal-man took several for me in his box."

Mr. Tutt stated that he saw this species in large numbers during August in the Valley of Aosta. There it flew in the intense sunshine apparently naturally, sitting on the thistles and sunning after the habit of the *Rhopalocera*. Mr. Barrett remarked how advantageous it was to see a species in its natural habitat, where the climatic conditions were most suited to its existence. *Callimorpha dominula*, L., was accustomed to fly in the hottest sunshine, while the nearly allied *Arctia villica*, L., only flew when disturbed. He suggested that the climate of our country was not suited to the really natural habits of *C. hera*, Devonshire being the extreme limit of its distribution both to the north and west. Mr. Jäger said that in Germany it was not found in lanes, but in the open spaces of woods, where flowers abound, and near vineyards. The districts in the two countries where he had seen the species were most dissimilar. On damp days he had been very unsuccessful in obtaining specimens. Mr. Tutt did not think that a species would so markedly change its habits, and considered that further observation was needed. He had seen the species only in watercourses at the bottoms of the valleys, the sides of which were covered with vineyards; these gullies covered with flowers were certainly not to be compared with our English lanes. In answer to Mr. Barrett he said that he did not notice the species during the daytime engaged in the ordinary business of life, either in copulation or egg-laying, Mr. Barrett remarked that *Agrotis vestigialis*, Hufn., *A. tritici*, L., and *Dianthæcia carpophaga*, Bork., species whose habit it was to fly at night, moved from place to place in very hot dry weather, and suggested that having become thirsty they were seeking moisture, or that they were disturbed by the direct rays of the glaring sun penetrating their retreat.

Mr. Winkley exhibited two specimens of a second brood of *Smerinthus populi*, L., bred by himself; the ova were laid in April, and the imagines came out in the middle of August. He had taken no particular care of them, and they were somewhat smaller than those of the usual brood.

Mr. Winkley also exhibited some of the results of his experiments in breeding *Helix pomatia*, L., from the ova. In one of his large flower-pots, containing the mature molluscs, he had recently found four clutches of ova; in the first cavity were 62 eggs just hatching, in the second cavity 36 young just emerged, in the third 63 ova on the point of hatching, and in the fourth 1 ovum also hatching. He thought the last, consisting of a single egg on the point of hatching, to be very remarkable, but suggested that he may have removed the parent while engaged in laying. Finding these clutches so recently seemed to him to suggest that there are two broods. Mr. Step thought that in years like the present, when the continued moist atmosphere was so conducive to molluscan life, the breeding went on without cessation throughout the summer. He remarked that the specimens exhibited were dark and mottled so as to closely resemble the young of *Helix aspersa*, L., but did not think that this was due to their food (lettuce).

Mr. Filer exhibited a long series of *Papilio machaon*, L., from Cambridge, bred during 1893 and 1894. In all the specimens there was a very considerable development of bluish scaling. One specimen had the black marginal band on the secondaries extended inwards sufficiently to meet the discoidal spot. On the primaries of another specimen the third of the central light blotches from the inner margin contained a distinct black spot.

Mr. H. Moore exhibited a specimen of *Vanessa urticæ*, L., taken in August at Chaunai, Vienne, having the two central spots represented by only a few dark scales; he also exhibited two cocoons of *Saturnia pavonia*, L., and stated that many roads south of the Loire were strewn with dead larvæ which had been killed while wandering by passing vehicles.

Mr. Williams exhibited a tube containing a specimen of the intestinal worm *Gordius aquaticus*, which had emerged from the body of a water spider taken at Wisley. Several members had seen lepidopterous larva attacked by similar parasites.

Mr. A. Hall exhibited a number of species of Rhopalocera he had received from Japan, among them being several identical with those found in Great Britain, such as *Papilio*

machaon, L., *Leucophasia sinapis*, L., *Gonopteryx rhamni*, L., *Vanessa urticæ*, L., *V. antiopa*, L., *Argynnis paphia*, L., and *Limenitis sibylla*, L., and also other species almost identical. He stated that out of forty species he received, over twenty were referable to species indigenous to Britain.

Mr. T. W. Hall exhibited a considerable number of *Melanippe fluctuata*, L., obtained from Perthshire. Several were of the form var. *neapolisata*, Mill., one was of an ochreous coloration, others had the central dark band more or less obliterated or narrowed in the inner marginal half.

Mr. Robert Adkin exhibited, on behalf of Mr. R. Armstrong Adkin, the following mollusca:—light forms of *Helix aspersa*, Müll., brown and grey forms of *H. ericetorum*, Müll., having unusually high spires, an unusually large specimen of *H. virgata*, Da Cos., also with a high spire, and *H. caperata*, Mont., all from Eastbourne, Sussex.

Mr. Step noted how dark *Helix aspersa* was this year, and attributed it to the unusually wet season. He also said that he had noticed it climbing much higher into the trees than he had ever observed it to do before.

Mr. Perks exhibited a photograph of the fox shark, *Alopias vulpes*, which had been captured off the coast of Devon. The fish measured seven feet in length.

Mr. West (Greenwich) exhibited on behalf of Mr. Tugwell a box containing a large number of *Zygæna exulans*, Hoch., taken in July of this year at Braemar, with cocoons *in situ* on crowberry (*Empetrum nigrum*, L.), and communicated the following note:—

“There are two rows of females and three rows of males. The females have white, the males have black legs; the females have a white collar to the thorax, while in the males the thorax is entirely black; the body of the female has short hair or scales, but on the body of the male these are long and fluffy; the females have the raised nervures of the wings dusted with white scales, while the males have no such scales.”

Mr. Tutt said that he had no idea what *Z. exulans* was like until he saw the Swiss ones in their native clime. In his opinion our Scotch var. *subochracea* was simply a rubbed and worn insect picked out, and in its pristine condition no doubt equally beautiful with the Swiss insect.

Mr. Tutt then remarked upon the different climatic conditions under which the same species live in high alpine districts and in our own country. He stated that it was impossible to obtain any Noctuæ flying at night. The heat

of the day on the high mountain slopes was intense, often reaching 100° in the sun, while at night there was 5° or 10° of frost; even the flowers closed at night, and were of conspicuous colours as red or blue, affording no opportunity or attraction to nocturnal insects. In the daytime *Agrotis tritici*, L., and *A. lucerneæ*, L., flew in hundreds, but he found none at night, and could obtain no evidence of an evening flight. The Noctuæ of the High Alps were essentially day flyers. He supposed that the habit of flying by day to be the original habit of ages, and that those species which flew at night had acquired that habit under external influences of gradual geological changes. Thus he thought that these Noctuæ simply retained their ancient habits, while the same species in our own country had modified them to suit its environment. To suppose that night-flying was the original habit would necessitate an inversion of the geological changes to which undoubted and irrefutable evidences point. He might say, however, that he saw no oviposition going on by the Noctuæ, and of *A. lucerneæ* he saw not a single female, although the males were in abundance.

OCTOBER 11th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. E. H. Trenerry was elected a member.

Mr. Oldham exhibited series of the following species, taken this season in his own garden at Woodford, Essex. A long and varied series of *Triphaena pronuba*, L., of which all but three were of the form *innuba*, Tr., without the white collar to the prothorax; *T. orbona*, Hufn., and a few *Plusia gamma*, L. Mr. Barrett remarked upon the large and wide range of variation shown in the *T. pronuba* exhibited, and said there were a few of the less scarce tints among them, such as the bluish plum-coloured and the whitish-grey forms. Some also were very red for South of England specimens.

Mr. R. Adkin exhibited, on behalf of Mr. R. South, series of the following Tortrices, taken by the latter in North Cheshire during the past summer: *Pædisca sordidana*, Hb., *Peronea hastiana*, L., *P. sponsana*, Fb., *P. comariana*, Zell., *P. comparana*, Hb., *P. perplexana*, Barr., and *P. schalleriana*, L., and read the following note:—

"I cannot consider that the last three insects are specifically distinct from one another; and the *comariana*, which were all captured among bog myrtle (*Myrica gale*, L.), seems as if it might be simply a phytophagous race of *comparana*, that is,

if we take all the specimens in the last four rows as varieties of one species, viz., *comparana*."

In the discussion which followed, Mr. Barrett said that the genus *Peronea* was an exceedingly difficult group to lepidopterists on account of the great range of variation. It was thus most uncertain what characters could be relied upon to distinguish the various species, and, in consequence, authorities did not agree as to their number. The older entomologists had named many forms as species, some of which were only either local races or food varieties. One of their names, *proteana*, H.S., showed that they recognized the unstable characters exhibited by the species we name *P. comariana*, Zell. The same species had a food variety called *potentillana*, Cooke, from Lancashire. The two species, *P. comparana*, Hb., and *P. schalleriana*, L., had always been a puzzle to him, and he had sought to solve the difficulty by recognizing an additional species, which he had named *P. perplexana*, and which was characterized by a somewhat sharper apex and a longer curved point to the primaries, and, generally speaking, was not so suffused in coloration. Under this name he also included a paler form with the same characteristics. It seemed to him to be undoubtedly an intermediate species. The larvæ of all this group were extremely alike in form, shape, and habits, and to a greater or lesser extent were general feeders. *P. perplexana* was obtained from hawthorn, while *P. comparana* and *P. schalleriana* were found on sallow, but were not confined wholly to it. Mr. Tutt said that in the Isle of Wight he had obtained all three species from the same food plants. He was, however, much puzzled by his observations at Deal. There, in July, he had found a small race of *P. comparana* confined to hawthorn, while later in the year the same form was to be obtained from willow. It suggested a second brood certainly, but yet, as a rule, he favoured the idea of a continuous brood of all the *Peroneas*, and in the fens such had been his experience. Mr. Fenn corroborated Mr. Tutt's remarks as to a continuous brood.

Mr. R. Adkin exhibited, on behalf of the Rev. J. G. Greene, drawings of sixteen of the most striking varieties of *Abraxas grossulariata*, L., bred by him during the last few years, and read the following remarks:—

"I send herewith drawings of some varieties of *Abraxas grossulariata*, bred by myself during the past and present years (1893-4). My chief object in doing so is to ventilate my opinion on the subject of variation; I do not mean

'aberration,' nor do I refer to *local* forms, but only to colouring, markings, etc., in a species when confined to one locality. There has been much, and sometimes acrimonious discussion, as to the causes of such variation, atmosphere, soil, moisture, dryness, etc., especially food. Further, many suggestions have been made as to methods of producing such variations—viz., change of ordinary food, more or less light, or no light at all, etc. After nearly fifty years experience, the conclusion that I have come to is a very simple one—namely, that we know nothing whatever on the subject, and that we never shall. Allow me to illustrate my meaning. The insects which I have drawn and coloured are some of the more striking varieties selected from over two thousand bred during the past two summers. They are accurately (so far as has been in my power) drawn and coloured as to size, shape, variation, markings, and difference in the right and left sides of the same specimen. In addition, I had at least a thousand which perished from various causes—ichneumons, disease, etc. Now, every one of these larvæ were taken within a mile radius of my house; all, without exception, were found on one plant, the common *Euonymus*, growing in the gardens round about. In captivity they were fed on the same plant, with the addition of the common currant. All were bred in the same room, the same light, no effort was made to produce varieties by food or any other means. I will ask you now to examine the drawings, especially figures 1, 2, 3, 6, 8, 10 and 11. How and why were they produced? We don't know, and we never shall. Several of these variations I have never seen the like of. Of course I let the majority of the perfect insects go, but I have kept some three hundred or four hundred, no two being exactly alike. It is rather a curious fact that at least four-fifths of the most striking varieties are females."

The chief peculiarities of the figures above referred to are:—

1. Basal half of fore-wing almost entirely black.
2. The whole insect dusted with black scales.
3. Almost devoid of markings, except a few black dots; asymmetrical.
6. Markings on basal portion of wings almost obliterated.
8. Small size, and comparative absence of black markings.
10. Black markings forming longitudinal streaks.
11. Finely dusted with yellowish-grey scales.

The other figures represented various modifications of the above extreme forms.

Mr. Barrett thought that variation was but little affected

by food, but very greatly by climate. Although Mr. Gregson claimed that many of his varieties were produced by food, yet he had taken especial care in selecting the parents and crossing.

Mr. Robert Adkin also exhibited *Acronycta rumicis*, L., from the Scilly Isles, Isle of Man, South of Ireland, and North of Scotland, and remarked that the series was interesting in that the Scillonian, Manx, and Scotch specimens were all light in colour, while among the Irish, both captured and bred, were many quite dark, one in particular among the latter, having the fore-wings velvety black, with the exception of a white submarginal line and fringes, and a small dot of the same colour at the anal angle, and the hind-wings much suffused with dark grey.

He also exhibited a series of *Eupithecia jasionneata*, Crewe., bred from larvæ taken in the South of Ireland.

Several members agreed that the dark form exhibited was the form of *A. rumicis* called *salicis* by Curtis.

Mr. Mansbridge exhibited a very long bred series of *Abraxas grossulariata*, L., and read the following note:—

“In 1891, I had about 1,000 larvæ taken in a garden at Horsforth, but not one var. was bred. In 1892, from the same number of larvæ taken in the same garden I bred 68 varieties one of which was figured in Mosley’s varieties of Brit. Lepidoptera. The series of *A. sylvata*, L. = *ulmata*, Fb. from Edlington Wood, Doncaster, represents the normal amount of variation selected from upwards of 10,000 specimens in the wood. The smoky suffused var. was very rare.”

Mr. Adkin remarked that in the *A. grossulariata* of one year the variation was in the same direction in most of the specimens, viz., a general elongation of the black spots. Mr. Fenn said that in the neighbourhood of York he had always understood there was a constant pale form of *A. sylvata* which was by no means uncommon.

Mr. H. Moore exhibited a female of *Lycæna corydon*, Fb., from Amboise, in France, having the male coloration. It was a most beautiful variety, the blue being of two distinct shades, the lighter forming broad lines along all the veins. He also exhibited specimens of *Bombyx quercus*, L., from Gironde, *Catocala nupta*, L., from Podensac, and *Ocneria dispar*, L., from Bordeaux, with a batch of ova laid by the latter. He remarked that *O. dispar* was seen not uncommonly in both North and South France, but he had not observed a single specimen in mid France. Mr. Barrett called attention to the profusion of down covering the ova of

O. dispar, and said how curious it was that so careful an observer as Curtis should state that this down was placed over the eggs by the male; of course it was no such thing. Mr. Tutt said that he believed that it was not generally known that Wilkes, in his book dated about 1743, stated this species was introduced from Germany some years previously. Yet in his description of the figure he calls it British. Mr. Barrett could not believe it to have been introduced. Curtis nearly 100 years later had found it in plenty in Whittlesea and Horning Fens. It was a most prolific species on the Continent, being in some places a plague and a nuisance from the destruction caused by the larvæ, and by no means confined to fen land districts, thereby being very comparable in its history to *Papilio machaon*, L. On numerous occasions he had liberated numbers of this species in the fens, and yet it invariably died out. Either it was destroyed by the agency of birds or it was not constitutionally fitted for the conditions under which it found itself. Of course it may possibly exist in some unexplored locality of this country, but he did not consider it probable. No doubt here we were just on the extreme western outskirts of its distribution. He thought that the Continental form exhibited was like the old fen form both in size and appearance. Mr. Fenn, however, stated that they were very distinct in appearance. As regards size, Mr. Tutt said that by careful selection from the small interbred modern British form, Mr. Nicholson had obtained a series of specimens fully equal in size to the one exhibited.

Mr. McArthur exhibited the following insects from North Devon:—*Toxocampa cracca*, Fb., *Noctua glareosa*, Esp., some of the forms being beautifully red; *Acronycta rumicis*, L., very dark varieties; and *Agrotis agathina*, Dup., including some very red suffused forms.

Mr. Winkley exhibited a specimen of *Helix pomatia*, L., which had formed its temporary winter epiphragm, and also a detached epiphragm which had been prematurely cast by a specimen now forming a second epiphragm. Mr. Step said that this epiphragm was of the same nature as an operculum, but the latter was a permanent portion of the shell.

Mr. C. A. Briggs exhibited two specimens of *Plusia ni*, Hb., said to have been taken in England.

Mr. Tutt exhibited a specimen of *Eupithecia subnotata*, Hb., with unusually narrow wings; a specimen of *Agrotis ripæ*, Hb., from St. Anne's-on-Sea, being the first that had been taken in that locality; and two specimens of *Eupithecia subfulvata*, Haw., var. *oxydata*, Tr. (*cognata*, St.).

Mr. Fenn exhibited short series of *Cirrhædia xerampelina*, Hb., from the Isle of Man, and examples and series of *Aporophyla australis*, Gn., *Epunda lichenea*, Hb., *E. lutulenta*, Bork., *Anchocelis lunosa*, Haw., *Calocampa vetusta*, Hb., and *Xylina semibrunnea*, Haw., all from Deal. The specimen of *A. lutulenta*, was a remarkable banded form, comparable with the variety often obtained from Ireland.

Mr. Tugwell sent for exhibition a long series of *Zygæna exulans*, Hoch., from Braemar with a few Swiss specimens for comparison and contributed a paper thereon (p. 92).

Mr. Tutt exhibited a long series of the same species from Switzerland with several Scotch specimens for comparison, and contributed a paper thereon (p. 94).

In the discussion which ensued, Mr. Tutt said that many Alpine valleys seemed to possess more or less well defined and distinct local races of *Z. exulans*. He had mixed the Swiss and Scotch specimens in his box and he defied anyone to separate them. As a matter of fact the Scotch and Swiss males of this species were perfectly indistinguishable, but as a rule the females could, with some care, generally be differentiated. The Scotch females more resembled the males than did the Swiss females.

OCTOBER 25th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. H. Lamb, of Maidstone, and Mr. A. Cosway, of Watford, were elected members.

Mr. Jobson exhibited a very pale variety of *Abraxas grossulariata*, L., captured in his garden at Walthamstow. The usual black markings were almost wholly absent, the marginal dots being the most conspicuous feature, while the yellow markings were in no way diminished in extent.

Mr. McArthur exhibited specimens of *Hypsipetes sordidata*, Fb. (*elutata*, Hb.), from North Devon. They were all bred, some from sallow, others from bilberry. It was remarkable that the bilberry forms were light, while the sallow forms were dark in coloration, exactly the opposite to what usually takes place.

Mr. Frohawk exhibited pallid examples of *Epinephele hyperanthes*, L., one with the right primary light and one with the right secondary light; also examples of *E. ianira*, L., one with the right primary light, and one with both wings on the left side partially light. All the specimens were cap-

tured, and the variation was of the same character as that of the *Erebia æthiops*, Esp., recently exhibited by Mr. Adkin. A long discussion ensued. Mr. Barrett observed that this kind of variation was almost confined to the Satyridæ, only a few examples in other families being known. Mr. Tutt remarked that Weismann's theory of "histolysis" would aid greatly in elucidating the causes of these variations. The general idea had been that external influences must affect the pupa as a whole, whereas, in reality, it might suffer only in part. During the metamorphoses from larva to imago the tissue was wholly broken down and rebuilt again in the pupa stage, any excess such as would ordinarily exist going to form pigment. If no excess existed, then the pigment would not be normally developed. He explained how, in his opinion, undue pressure might influence the coloration; of course damp also might affect the pigment as well as retard development. Mr. Barrett noted that all the Satyridæ pupæ were laid close to the ground among the grass, and hence one side would, no doubt, often be more exposed to damp than the other. Mr. Step thought that pressure would tend to produce misshapen, crippled imagines, and Mr. Fenn said that a considerable percentage of bred insects differed more or less from the normal type in shape of wing. Mr. Tutt said that when a larva suffered an injury the tissue was weakened, and this weakened portion would not regain its vigour, but still be weak when broken down in the pupa stage. Of course, if the larva suffered from a deficiency of nutrition, the pupa and imago would be affected as a whole.

Mr. Tutt exhibited a series of *Emydia cribrum*, L., var. *candida*, Cyr., from the Alps, with New Forest forms for comparison. The Alpine specimens were almost entirely white, having scarcely a trace of the dark markings seen in our British race of this species. The spot where they were taken was very rocky, just below the larch region. The ground was covered with dried and dead twigs of barberry and juniper, to the white stems of which they were clinging. He understood that in the Pyrenees there existed an absolutely black form. Thus our New Forest form was an intermediate, and the species was a very good instance of variation by natural selection according to environment. He also exhibited two specimens of the new British species *Cataplectica farreni*, Wals., from Cambridge.

Mr. Mansbridge exhibited the dry carcase of a mole taken from a barn-door, which was covered with the dry frass, cocoons, and pupa cases of a species of lepidopterous insect.

It was found near Cheltenham, and had hung up about two years. The cocoons were tough, and had frass woven all over the outside.

Mr. Robert Adkin exhibited a series of *Asphalia ridens*, Fb., bred in April last, from the New Forest, and remarked that the chief point of interest attaching to them was their singular uniformity, which was contrary to his previous experience of the species; also a short series of *Lycæna ægon*, Schiff., taken on the occasion of the Society's Field Meeting at Oxshott, on the 28th of July last. The series included an underside variety of the female in which the two spots on the costal margin of the hind-wings were united, thus forming a short bar. He said that although this phase of variation was not infrequent among some of the other members of the genus, he had not previously noticed it in this species.

Mr. T. W. Hall exhibited a living specimen of the family Julicidæ he had found at Stevens' sale rooms. It was undoubtedly of foreign origin, and probably had been secreted among the bulbs recently sold there.

Mr. Williams, in referring to the discussion at the last meeting on *Zygæna exulans*, Hoch., stated that Mr. Reid, who had some experience of the species in its Scotch locality, was of opinion that it was always thinly scaled. Mr. Adkin said there was a great difference in specimens. He possessed some, which Mr. Reid had sent him, fairly well clothed with scales. Mr. Tutt said that it was most interesting to him to find that the pale markings, which in Scotch individuals were truly sexual, were not so in Swiss specimens, for he possessed males from the Alps with the distinctive white collar.

Mr. Step read his report of the Annual Fungus Foray, on Saturday, October 13th (p. 90).

Mr. Tutt read a paper, entitled "*Zygæna carniolica*, and its Varieties" (p. 97). Mr. Barrett proposed, and Mr. Fenn seconded, a hearty vote of thanks to Mr. Tutt for his able paper. In the discussion which ensued, Mr. Tutt said that Dr. Chapman and himself had especially looked for any intercrossing among the *Zygænidæ* in the Alps, and in no single instance did they observe it. He knew that Mr. Fletcher had observed it in our own country, and, of course, it was quite possible that it might occur in Switzerland, although they had not observed it.

NOVEMBER 8th, 1894.

E. STEP, Esq., *President*, in the Chair.

Mr. R. South exhibited a number of species of Lepidoptera representing this season's collecting in the neighbourhood of Macclesfield, and remarked that the present year was the most barren he had ever experienced. He also exhibited a bred series of *Cidaria truncata*, Hufn., var. *centum-notata*, Fab., and said that altogether 41 specimens were reared, and of these 17 examples were like the female parent, 13 were paler, and 11 were darker. The larvæ were fed on strawberry throughout. The female was captured at the end of May, 1894, at Northwood, Middlesex. They emerged in August, at the same time that *C. immanata* was on the wing, at Macclesfield. Mr. Barrett noticed, among the specimens exhibited, a perfectly unicolorous form of *Hepialus vellela*, Hb., a very beautiful form of *Cabera pusaria*, L., in which the transverse lines were much developed in size and depth of colour, and several specimens of dark-toned *Scoparia murana*, Curt.

Mr. Frohawk exhibited several specimens of *Vanessa atalanta*, L., having a considerable development of white scales in the red band of the primaries, forming an incipient blotch. One of the examples was bred from the egg, the rest from larvæ taken at random. He also showed a pale specimen of *Thecla rubi*, L., from Cannock Chase.

Mr. H. Moore exhibited a turnip with the rootlets very remarkably and extensively clubbed. This was caused by the attack of a fungus, *Plasmidiophora brassica*. The spores had entered the rootlets and seemed to have drawn down the substance of the turnip, which became hollow, to form the excrescences. These were not galls, although grubs took refuge in the spaces formed by the removal of the substance of the turnip.

Mr. Robert Adkin exhibited a series of *Dicranura furcula*, L., and *D. bifida*, Hb., bred respectively from the New Forest and Bucks, and remarked upon the difficulty of separating the two species in the imago state. He said that he had carefully studied the various markings in each, but had failed to find any that could be relied upon; perhaps the most constant character was the outer margin of the central dark band which in *furcula* was generally considerably indented near the costa and much less so in *bifida*; but even this was not always so, as would be seen by one of the *furcula* now exhibited, which, although undoubtedly that

species, had no more indentation in the outer margin of the central band than many of the *bifida*. Again, in *furcula*, the outer margin of the primaries was generally whitish, while in *bifida* it was generally grey; but this character was even less reliable, for in many of the Scotch *furcula* the outer margin assumed a decidedly greyish shade, and in *bifida* it was occasionally very pale. He thought, however, that *furcula* generally had a yellower shade than *bifida*, and that this, taken in conjunction with the other characters mentioned, would generally be found a sufficient means of distinguishing the two species.

Mr. H. Moore exhibited a short series of *Chrysophanus phlaas*, L., from the Gironde, and said that, according to the new views, these specimens coming from a more southern and hotter locality should show considerable difference in tone from British specimens, whereas they were to all appearances absolutely identical with our usual form. Several members concurred that the aggregate annual temperature of the two districts would be about the same.

Mr. Fremlin exhibited a series of *Emydia cribrum*, L., from the New Forest, and also of *Dasycampa rubiginea*, Fb., from Berks. The former series contained an interesting dark variety.

Mr. Manger exhibited a very large specimen of *Vanessa cardui*, L., from Polegate, the band on the fore-wing being unusually fine and containing a distinct white spot.

Mr. Perks exhibited a specimen of *Phyllodromia germanica*, L., and Mr. Carrington remarked that it was an Eastern species, and that its introduction dated from the return of troops from the Crimea.

Mr. Carrington exhibited a number of galls from Western Canada, those on a species of golden-rod being very remarkable; a quantity of freshwater shells, similar to those of our own country, such as *Planorbis*, *Anodonta*, &c., found dead on the shores of Lake Manitoba, at high-water mark; a specimen of the fruit and seeds of "wild cucumber," which he stated was an excellent and handsome garden creeper; an example of a large water bug, *Belostoma grandis*, from Lake Winnipeg, and several living larvæ of *Spilosoma isabella*, Abb. In the course of his remarks, Mr. Carrington said that his journey this year had been an autumnal one, and that he had visited many parts of Manitoba, going some 1400 miles in that province. So similar was the general character of the flora and fauna of this vast district to that of Europe, that it was at times extremely difficult to persuade one's self that one was so many

miles away from home. Many species, both of plants and insects, were, if not absolutely the same, very closely allied species to those of Europe. The Canadian Pacific Railway goes through a forest region to the north of Lake Superior for quite a thousand miles from east to west, and north this forest extends right up to the limit of trees, towards the Arctic circle. To him this forest of fir seemed but little different in appearance to some Scotch scenery, except that the trees were of small growth; the forest fires which regularly devastate each region prevented any large growth. He had this year paid particular attention to the flora, and it seemed that many plants were absolutely identical with those found in Europe, but had other names. The so-called "bluff lands," the somewhat undulating portions which alternate with the prairies, were timbered with short maple and poplar, the latter having white bark, which at a distance made it appear like the birch of our own country. Civilization had only penetrated to this region some twenty years, yet many European plants had been introduced and were spread in every direction, growing luxuriantly. The common yarrow of our banks and meadows had made its way right from the Atlantic to the Pacific coast, through both forest and prairie. At the time he was there several species of sun-flowers made the prairies one golden mass of bloom, giving it a most remarkable appearance. He had collected some hundreds of plants, and he was much indebted to Mr. Fletcher and Professor Macoun, of Ottawa, the Government Naturalists, for naming them, at considerable inconvenience to themselves. There was much work to be done in that region, for although he had kept to the beaten tracks and had but few opportunities for collecting, yet he had found many local and rare species. Around Lake Manitoba the sand-hills gave the appearance of some parts of the English shores, but the waves of this inland sea were quite oceanic, reaching seven or eight feet in height as they broke on the shores. There was no chalk in the district, and consequently the shells found were thin and very deficient in lime. Salt, however, existed in the form of alkaline deposits in many places, and seaside plants of Europe were found throughout the prairies; among them was a species nearly identical with our common samphire. The autumnal tints of North America must be seen to be appreciated; the fiery brilliance of the dying foliage was a most enchanting and magnificent display.

Mr. Tutt read a paper on "*Zygæna achilleæ*, Esp." (p. 100), illustrating it with a long series of the species from the Alps.

Mr. Trenerry exhibited a light variety of *Chrysophanus phlœas*, L., from North Cornwall.

Mr. C. A. Briggs exhibited the following very fine varieties of *Lycæna bellargus*, Rott.:—

1. A dark leaden-coloured male from the Downing collection, captured at Folkestone by Mr. W. Austen, September 12th, 1892.

2. A very dark blue-brown male, with conspicuous orange tips to the antennæ, taken at Folkestone by the late Mr. W. P. Weston, in September, 1875.

3. A male, all the wings dark brown, shot with blue, taken by Mr. Chatwin, at Dover, in 1880.

4. A fine streaky var. of under-side male, in which the row of submarginal spots on the fore-wings are developed into streaks, radiating towards the discoidal spot, which, in turn, is connected by a streak with the basal spot.

5. A female, under-side variety, in which the whole of the ordinary markings are absent, being replaced by a few ocelli irregularly placed. This specimen is possibly *icarus*.

6. A remarkable under-side var. of male, captured at Folkestone, in 1875, by Mr. I. Moore. The hind-marginal spots are completely "blind" and very pale. The ocelli of the hind-wings are entirely absent, while in the fore-wings only the discoidal and some of the sub-marginal are left.

7. A gynandromorphous specimen, the left fore-wing being conspicuously male, the left hind-wing slightly splashed with male colouring. Taken by Mr. Bayley, at Dover, in 1879.

8. A probably unique var. of the female, taken by Mr. Austen, at Folkestone, in 1891. With the exception of the hind-marginal row of ocelli the whole of the wings are of the colour of the male.

9. A singular var. of the female, taken at Folkestone by the late Mr. W. P. Weston, in which large patches of the wing are entirely destitute of scales, and showing the under-side markings through.

NOVEMBER 22nd, 1894.

E. STEP, Esq., *President*, in the Chair.

The President announced the death of Mr. J. R. Wellman, one of the founders of the Society; and it was unanimously agreed that a letter of condolence be sent to the family.

Mr. C. G. Barrett exhibited, on behalf of Mr. Sydney Webb, a grand series of varieties of *Arctia villica*, L., including a form with only one small black spot and black costal

and hind-margins on the fore-wing; two asymmetrical forms with much more cream colour on one fore-wing than the other; and another having the black colour suffused over almost the whole of the wings. He also exhibited, on behalf of Major Still, a number of species taken this year on Dartmoor, all of which were darker than usual, and apparently effected by the extreme humidity of the season. Among the specimens were *Pararge megæra*, L., showing an increase in the extent of the black markings, a black example of *Plusia gamma*, L., a very rich specimen of *Cidaria siderata*, Hufn. (*psitticata*, Schiff.), having a green marginal border on the hind-wings, a very much suffused black form of *Polyommatus phleas*, L., in which the red band on the hind-wings was entirely wanting, and a dark variety of *Pararge egeria*, L.

Mr. R. Adkin exhibited, on behalf of the Hon. R. E. Dillon, of Clonbrock, Ahascragh, Ireland, the following species, all from Ireland:—*Tæniocampa gothica*, L., var. *gothicina*, H.S.; *T. gracilis*, Fb., and red variety; *Xanthia gilvago*, Esp., *Aplecta nebulosa*, Hufn., dark form; *Eugonia fuscantaria*, Haw., *E. erosaria*, Bork., *Boarmia repandata*, L., an almost black variety; *Thera juniperata*, L., and *Cheimatobia boreata*, Hb.

Mr. Tutt exhibited a large number of specimens of Lepidoptera taken this year in Southern France, and contributed the following notes upon them:—

“These specimens were captured on the morning of August 22nd, at Grésy, near Aix-les-Bains. Near the station the second brood of *Leucophasia sinapis*, L., with its distinct apical spot and purer white colour, was flying freely, whilst in most of the fields *Colias edusa*, Fb., and *C. hyale*, L., were abundant. Climbing up to get a view of the lake, *Satyrus arethusa*, W.V., was somewhat abundant on the stony slopes. The specimens varied very considerably in the depth of colour and development of the orange band, and slightly in the development of the spots therein. The females, too, as frequently happens in this genus, are somewhat paler in colour. We appear to have met with all the forms mentioned by Staudinger—ab. *erythia*, Hb., described as ‘subtus dilutior;’ var. *dentata*, described as ‘supra fascia latiore; alis posterioribus subtus venis albis, linea dentata ante marginem,’ which is, according to Staudinger, restricted to south-east France; var. *boabdil* is, according to Staudinger, restricted to the Andalusian Mountains, and is described as ‘Supra obscurior, subtus dilutior venis albis,’ but some of the specimens captured, as will be seen from those exhibited, agree well with this description. Among the undergrowth that

covered the hill slopes higher up, *Satyrus dryas*, Scop., was abundant, the males, like great black leaves, flying about and looking very conspicuous against the bright greenery whilst on the wing, although inconspicuous enough when settled on the leaves or ground. The larger females, with great purple-centred ocelli, are distinctly paler than the males, the latter varying much more in the size of their ocelli. Side by side I exhibit three specimens of *S. minois*, from Montreal, Canada. I have examined them most carefully, and fail to find a single point of difference between them. A little farther up, on the broken limestone, *Satyrus briseis*, L., was not uncommon, and flew on strong and active wing. All the specimens had two well-developed spots in the white transverse band of the fore-wing, whilst a third spot, just above the lower of the normal pair, varied in size from a tiny point to a spot almost as large as the others. Two of the few specimens captured have no trace of this third spot. One male specimen has the white band much restricted by the fuscous shading, the white being much narrowed on the fore-wings and entirely clouded with greyish fuscous on the hind-wings. There is a female aberration of this species described by Staudinger as 'fasciis infuscatis,' and referred to the *pirata* of Esper. It comes from 'South France, Pontus, and Armenia.' It would appear from my capture that *pirata* is in no wise an entirely female form.

"Among other interesting species captured were *Erebia æthiops*, Esp., at a remarkably low level considering the low latitude for this species. It appears strange that an insect which in our insular way we associate with a high altitude or high latitude should be an inhabitant of the hottest parts of Southern France. I saw the same species at Bourg St. Maurice. *Melitæa athalia*, Rott., and *M. cinxia*, L., occurred in a clover field; probably the specimens of both were of a second brood, as the first broods of both species had been over in England some two months before. *Argynnis dia*, L., *A. aglaia*, L., *A. latona*, L., and other species occurred on the same ground. *Epinephele tithonus*, L., *E. lycaon*, Rott., and *Pieris daphidice*, L., were observed, and in a warm corner several specimens of *Lycæna argiades*, Pall., flitted restlessly about, with a local form of *Pararge megæra*, L., *Lycæna bellargus*, Rott., *L. corydon*, Fb., *L. medon*, Esp., and *L. icarus*, Rott., were very abundant, and a second brood of *Nemeobius lucina*, L., kept company with a number of species belonging apparently to the genus *Syrichthus*. Many Heterocera (mostly of common British species) were also observed."

He also exhibited specimens of British *Lycæna ægon*, Schiff., mixed with a series of Continental *L. argus*, L., and asked if any one could point out the differentiating characters of the two so-called species.

In the discussion which followed, Mr. Barrett said that *E. æthiops*, Esp., was by no means a mountain species in this country. Mr. Mansbridge said that he had taken this species high up the Pennines, at Grassington, its most southern locality in England; and Mr. H. Moore said that, while at Tonerre, in the French lowlands, it was in perfect condition; a few days later on the higher Juras it was very much worn.

Mr. Fremlin exhibited a fine specimen of *Charocampa celerio*, L., captured at the S. Foreland lighthouse, on August 12th, 1894.

Mr. Mansbridge exhibited two bred series of *Selenia bilunaria*, Esp., from Horsforth and York respectively. He said that the larvæ had fed freely, and that many of the pupæ were lying over. He was pleased to get some of the *juliaria*, Haw., form which was unusual in the North of England—in fact, only obtained when the species is bred. One female was very peculiar in having only the central band developed. Mr. Tutt said that var. *juliaria* flew freely at Wicken, in August.

Mr. Moore exhibited a specimen of *Pieris daphidice*, L., taken near Blois, in France.

Mr. Tutt exhibited a large number of *Zygæna transalpina*, Esp., and read a paper thereon (p. 104). One specimen was especially prepared to show the curious tufts of feather scales on each side of the genital organs, which are generally hidden within the anal cavity, and which are supposed to be scent glands. Mr. Barrett said that these tufts were often very dense in many Tortrices.

Mr. Adkin exhibited a number of species taken during his holiday this year at Eastbourne, and read a paper entitled, "Reflections upon Odd Rambles on the Sussex Downs" (p. 114).

In a discussion which followed, Mr. Tutt said that he had observed a curious habit of *Erebia tyndarus*, Esp., in the High Alps. It rests on the cow paths and broken pasture, and, closing its wings, its silvery grey lines and shades make it quite invisible. Then it falls over on its side, and draws up its legs. Without appearing to move, it wriggles itself by muscular contraction, still keeping on its side until it reaches the shelter of the nearest clump of grass, and there soon settles down safe from harm. Mr. Frohawk said that there was no doubt that butterflies were able to distinguish colours.

He had seen *Pieris brassica*, L., repeatedly settle on white blooms in a mass of red petunias. *Polyommatus phlaeas*, L., was in the habit of resting upon the withered heads of knapweed, and so effectually concealing itself. Mr. Barrett had seen both *P. brassica* and *P. rapæ* concealed in numbers under the leaves of the white poplar.

DECEMBER 13th, 1894.

T. W. HALL, Esq., F.E.S., *Vice-President*, in the Chair.

Mr. Leigh Robinson, of 54, Boundary Road, N.W., was elected a member.

Mr. C. A. Briggs exhibited a striking variety of *Eurrhlypara urticata*, L., in which all the black markings were considerably extended, the marginal and submarginal bands being more or less merged.

Mr. H. Williams exhibited several specimens of *Vanessa urtica*, L., and contributed the following note:

"The two short series of *Vanessa urtica* exhibited are representative of very long ones bred from Leigh, Essex, this year, and are shown for the purpose of drawing attention to the great difference in the ground coloration and dusky markings of the two series. The whole of the larvæ were taken on one bed of nettles on the same day at the end of July, one batch being nearly full grown at the time, and pupated in a few days; these produced light imagines. The remaining larvæ were apparently just hatched when captured, and they fed up very well in glass jars, but when the resulting imagines emerged, the difference between the two broods was most striking, the ground colour of both wings of the latter brood forming a considerable contrast to the former, whilst the dusky ones, especially on the hind-wings, are much more suffused than in those which were bred from the larvæ which were full grown when they were taken."

Mr. McArthur exhibited specimens of *Coleophora laricella*, Hb., from North Devon.

Mr. Brooks, of Rotherham, exhibited the following species from that neighbourhood:—*Arctia caia*, L., a specimen with white fringe to the fore-wings. *Polia chi*, L., a series taken on the stone walls in Grange Park during 1893 and 1894. The specimens exhibit a considerable range of variation, from pale well-marked examples to dark olive individuals with scarcely any markings. In some specimens the hind-wings are marked in a similar way to the fore-wings. *Phigalia*

pilosaria, Fb., six dark examples taken in the above-mentioned park, Feb., 1894. This form is not at all common. *Abraxas ulmata*, Fb., the most plentiful insect during 1894. The specimens exhibited were selected from a very large number examined. *Hybernia progemmaria*, Hb., dark and intermediate forms. *Phibalapteryx lapidata*, Hb., a series from Fintry, near Glasgow. *Boarmia repandata*, L., a series of dark specimens bred from larvæ taken in 1894. This species is not common, but is mostly black, in the Rotherham district.

Mr. Robert Adkin exhibited a considerable number of specimens of *Melanippe fluctuata*, from various parts of England, Scotland, and Ireland, and remarked that although among those from each district there were individuals varying from the type, both as to considerably increased size and varied ornamentation, the majority of the specimens resembled one another very closely, and he thought it would be wrong to suppose that the species had assumed any special form, other than the type, in any particular locality.

Mr. W. A. Pearce exhibited the following Rhopalocera from the United States of America, to illustrate Mr. Mansbridge's paper:—*Pieris rapæ*, L., *Chrysophanus hypophlæas*, Bd., *Lycæna pseudargiolus*, Bd., *Vanessa antiopa*, L., *V. atalanta*, L., and *Grapta comma*, Harris., from Pennsylvania; and *Colias eurytheme*, Bd., and *Vanessa cardui*, L., from Colorado.

Mr. Mansbridge then read a paper entitled, "The Lepidoptera of the Indian Territory" (p. 120), and exhibited a large number of specimens in illustration thereof.

A discussion ensued. Mr. R. Adkin stated that he was especially interested in migration, and thought that Mr. Mansbridge's observations on this subject were particularly useful. Mr. Tutt referred to *Colias eurytheme*, Bd., noting that the spring brood of that species was pale yellow, the summer brood a dark yellow with a pale costa, while the autumn brood had pale yellow males and dark yellow females, and compared it with the European species *C. edusa*, Fb. He had no doubt that the two species were of common origin, arising when a temperate climate existed in more northern regions. He thought, however, it was a mistake to call *C. eurytheme* a variety of *C. edusa*. He would prefer to call each a "species," using this term in the ordinary conventional way. Of the migration of *Anosia archippus*, L., he had read all the collected evidence, and considered it most unsatisfactory. The general opinion was that it went south in autumn and returned north in spring, only wintering in the

south. In his opinion this was not established, the records being often very unreliable. He did not dispute the going north ; the species would lay their eggs which would produce a brood to carry on the migration, until in autumn the species had reached far up towards the Arctic regions. As regards the south movement, he would say that the species often collected in countless numbers on the prairies in autumn, and no doubt were often driven many miles by storms. Mr. Mansbridge said there was no evidence of a return being made.

Mr. Tutt then read a paper entitled, "*Zygana medicaginis*, Bdv." (p. 107), and exhibited a large number of specimens to illustrate it.

Notes on the Coleoptera observed during the Society's
Field Meeting to Eynesford on June 20th, 1891, and
to Oxshott on June 10th, 1892.

By G. A. LEWCOCK: Read Feb. 22nd, 1894.

It is, perhaps, somewhat difficult to write again on the insects which have previously been reported to the South London Society, and the only excuse for referring to the subject once more, is the fact that they have not as yet been exhibited at any meeting of the Society. The two excursions in question were of the utmost enjoyment to myself, not only because I obtained a number of good species, but that they afforded me opportunities to revisit the scenes of my early entomological rambles, more especially those on Kentish soil. The glories of Kent are so well known that it is almost needless to expatiate upon them; but only those persons who have observed them early and late can fully realise the beauty of the scenery and of the insects which frequent the woods, downs and marshes of the county. The early riser often reaps a substantial advantage by betaking himself to the collecting ground during the small hours of the morning, and I can well remember on one occasion taking a newly emerged specimen (my first) of *Melanippe hastata*, L., at four o'clock, as it was drying its wings on a bending stem. On another occasion I found a bright looking female of *Arctia villica*, L., on Darland Hill at five o'clock; and it is as one looks at these specimens again in after-years that little reminiscences connected with their capture recur to the memory—our early doings in entomology being nearly always fraught with pleasing recollections.

The visit to Eynesford was certainly a red-letter day in my calendar; we had a jovial party, delightful weather, plenty of insects—at least beetles were plentiful—and a little encounter with the game-keeper to finish up the day: all of which tended to make things lively and interesting. The captures exhibited in connection with this visit are several specimens of the genus *Cryptocephalus*, the species are *C. lineola*, F., *C. aureolus*, Suf., *C. labiatus*, L., and *C. hypochæridis*, L. The genus is one of the most interesting, but the species are not taken very freely. Of *C. lineola*, I beat two from hawthorn; but up to the present time five specimens only have fallen into my hands, the other three having been swept at Oxshott. *C. aureolus*, like many other species, must be sought for at the exact time of occurrence, as it is soon over. Two of the specimens are from Eynesford, and the other from Oxshott. *C. labiatus* is generally a common species everywhere. *C. hypochæridis* is sometimes fairly common at Chattenden, that is to say, one may find a dozen specimens one day and none the next, so that this fact would stamp almost any insect common to some collectors. Speaking for myself, I do not attach much value to such distinctions as "common" and

"uncommon," because it often happens that from a want of knowledge of the insect's habits we fail to obtain our series. Then again the conditions of life necessary for the existence of certain species are not always favourable, consequently few of them reach the mature stage. Sometimes we may find a gap in the cabinet drawer which is not filled up simply because the insect is so common that the collector will not take the trouble to set any of the species. A case in point came under my notice when visiting a lepidopterist at Malden; several of the rarer species or insects more difficult to obtain, were duly installed in their proper place, but poor *Pieris brassicæ*, L., was represented by about as bad a lot as one could meet with, and the pins also were equally bad, one might have been a shawl pin.

To resume with the exhibits, *Otiorrhynchus tenebricosus*, Hbst., is the finest species of the genus, and four fell into the umbrella while beating at Eynesford. There can be no mistake in distinguishing the members of this genus—the name so well describes them. The beetle is generally obtained on chalky soils; I have taken it also on Box Hill. It may be of interest to note the change in the spelling of the words compounded with *rhynchus*. It would appear that Canon Fowler was the first to correct the spelling in our English Catalogues, and it is also adopted in the 1893 Catalogue by Sharp and Fowler; and, although the spelling with the double *r* is generally adopted in foreign Catalogues, there is even now a doubt as to which is the correct way to spell the word. Moreover, Aristotle (Book 27, I believe) spells *Ornithorhynchus* without doubling the *r*. The rule of doubling the *r* applies also to *Erirrhinus*, and other genera of the *Curculionidæ*. Very little importance need be attached to this change of spelling, as no one is affected by it, and only a slight difference is made in the pronunciation.

Other captures at Eynesford are *Cistela murinus*, F., and *C. luperus*, Hbst.; the former in abundance, but the latter sparingly.

Among the representatives of the Oxshott visit are several *Coccinella ocellata*, L. The whole of this series was bred from larvæ obtained on the excursion of June 10, and the observations respecting them have been set forth in the "Entomologist" for August, 1893. The most interesting specimen of the lot is one in which the black spots usually present on the elytra are nearly all absent—the only two well-defined being the humeral spots. *Cryptocephalus lineola* has been referred to previously. *Tachinus subterraneus*, L., is a very common insect in London gardens, particularly in the autumn, when red leaves bestrew the ground, but it is so exceedingly variable both in the markings of the elytra and the thorax, that I have placed several in the box to draw attention to the subject. By examining the specimens with a lens, it will be seen that the thorax of some of the beetles is often very much suffused with red, while in others there is only a slight reddish margin at the extreme base. Then again in two of the specimens the marking of the elytra extends

to a little more than half way down, while in others it reaches to the apex. Mr. Sharp, of Chester, to whom I sent some London specimens, informs me that *Tachinus subterraneus* is not common with him, and that the Chester types are blacker than the London specimens. The varieties occur freely in May and June at Oxshott, where I have often turned them up. The other two species are :—*Erirrhinus tortrix*, L., captured by Mr. South on aspen, in Middlesex, in spring of 1893. The insect also occurs at Oxshott, but I have taken single specimens only ; and *Balaninus tessellatus*, Four., beaten from oak at West Wickham, by Mr. Chaney, 1893. This likewise with others of the same genus occurs at Oxshott.

Notes and Observations on the Fauna and Flora of Reigate, made during the Society's Field Meeting on June 9th, 1894.

Compiled by HY. J. TURNER.

In spite of the inclement weather which seems to dog the footsteps of entomologists this season, twenty-two of our members who attended the Field Meeting at Reigate on June 9th, expressed themselves well pleased with the district, and spent a very pleasant afternoon and evening. The captures were not very large as regards numbers of specimens, but a fairly representative array of species was obtained. As the sun did not favour us with his presence more than for a moment or two, and as the air was so exceedingly moist, Rhopalocera were only found by searching for them in their resting-places. Perhaps the most abundant species was *Lycæna bellargus*, Rott., of which several females well marked with blue were taken ; *L. icarus*, Rott., was also in some numbers, and afforded several well marked females. Some *L. astrarche*, Bgstr., put in an appearance, and a very fine variety having the central portion of the upper wings suffused with a rich brown coloration was taken. *Cænonympha pamphilus*, L., was resting at the base of the grass stems, and a *Vanessa cardui*, L., was taken from a tree trunk. Among a group of nettles, where some members expected to take *L. minima*, Fues., the larvæ of *V. urticae*, L., were found nearly full-fed. Although *Zygæna filipendulæ*, L., is abundant in its season at this spot, no cocoons were visible on the luxuriant grass stems with which the steep slopes were clothed. *Setinia irrorella*, Clerck, was thought of, but rain prevented any attempt being made to search for it. The only object to represent the Bombyces was a batch of ova surrounding a grass stem, presumably those of *Bombyx rubi*, L., which occurs here in some numbers. Of Geometers a few were disturbed by the beating stick, such as the ubiquitous *Camptogramma bilineata*, L., *Melanippe montanata*, Bork., *M. fluctuata*, L., *M. sociata*, Bork., *Acidalia*

remutata, Hb., etc. When well searched for *Acidalia ornata*, Scop., was found, and several were captured by various members.

It was, however, among the Noctuæ that the prize of the Meeting was taken. *Pachetra leucophæa*, View., fell to the lot of our Treasurer, Mr. Adkin, who thus has the honour of re-establishing an old locality for one of our rarer insects. *Hadena dentina*, Esp., was one of the very few Noctuæ captured.

Among the Pyrales *Scoparia ambigualis*, Tr., and *S. dubitalis*, Hb., were in some numbers. The Crambi were present in the species *Crambus pratellus*, L., *C. hortuellus*, Hb., and one species as yet undetermined. A very few species of Tortrices and Tineæ, among which perhaps *Argyrotoxa conwayana* was most common, were observed, making a poor show for a locality which for years afforded so many species to several of the older entomologists, among whom I may mention one of our past-presidents, Mr. W. H. Tugwell.

Coleopterists were not very strong in numbers among us, but a few Coccinellidæ, such as *Adalia bipunctata*, L., *Coccinella septempunctata*, L., and *C. variabilis*, Ill., were noted, one or two species of *Telephorus* and a specimen of *Dascillus cervinus*, L., were beaten out. Ova supposed to be those of a *Coccinella* were taken on nettle leaves.

One of our members during the rain amused himself by searching for species of Collembola under yew bark, but I have as yet had no captures reported.

Those who took an interest in Mollusca must have had a treat. *Helix pomatia*, L., literally swarmed, many well banded forms being noticed. Eggs of this species were taken by two members. *Helix nemoralis*, L., was reported, and *H. ericetorum*, Müll., and *Cyclostoma elegans*, Müll., were both very common and variable, and both *H. caperata* and *H. cantiana* were found; also *Bulinus obscurus* and *Clausilia rugosa*.

Our Botanists collected a number of flowers in this luxuriant spot, which at this time of the year usually gives the searcher eight or ten species of Orchidaceæ. This year, however, it only produced one of the family, viz. *Ophrys apifera*, Huds., of which a number of spikes were plucked.

Members who took an interest in Bryology and Fungi seemed to have got together a fair sample of treasures.

Notes on the Fauna and Flora of Wisley, made during the Society's Field Meeting on July 7th.

Compiled by HY. J. TURNER.

Under the leadership of our President, Mr. E. Step, and Mr. C. A. Briggs, another most successful meeting was held at Wisley, Surrey.

The main object of the excursion was the exploration of the Hut Ponds and the surrounding woodlands.

Arriving at Effingham Junction, about thirty members and their friends started for the ponds. The first portion of the way lay along roads between woods of oak, beech, birch, and ash, which would no doubt, a month before, have afforded our ornithologists and oologists plenty of sport. As it was the tall hedges and wide bush-covered road-sides produced the nest of a bullfinch (*Pyrrhula europæa*, L.) with four eggs, a brood of young whitethroats (*Sylvia cinerea*, Bech.), and a most beautiful "cock's nest" of the wren (*Troglodytes parvulus*, K.), surrounded with festoons of the honeysuckle (*Lonicera periclymenum*, L.), forming a charming natural object.

The ditch beyond the first cottage on the left was not searched, but was stated to contain the molluscs *Physa hypnorum*, L., and *Limnæa palustris*, Mull., specimens of the former being remarkable for their size.

Until the first pond was reached very few Lepidoptera were observed, a few worn *Iodis lactearia*, L., some aged Crambi, *Scopula olivalis*, L., *Mimæseoptilus pterodactylus*, L., and *Lomaspilis marginata*, L., form a fair summary of what was seen. A number of bushes of *Rhamnus catharticus*, L., in a lane on the right were searched in vain for ova or larvæ of *Gonopteryx rhamni*, L. A dead bird produced a few ants, but no Coleoptera. The trees everywhere showed the effects of the late frosts of spring; the dead leaves, the dark green older leaves, and the bright green young leaves of the summer growth produced an unusual appearance. One insect I had almost forgotten to mention, although obtrusively conspicuous, was *Tortrix viridana*, L. On the left hand, near some gardens, a laburnum tree was seen having a number of full-sized clusters of blossoms along with bunches of the seed-pods from the May flowering. Just before reaching this a number of spikes of *Sedum reflexum*, L., were picked, no doubt a garden escape.

Our walk soon brought us to the fir woods, and ere long several members were at the ponds, fishing for various treasures. One of the first captures was a young pike (*Esox lucius*), and very soon plenty of specimens of *Planorbis corneus*, L., *P. complanatus*, Audt., *P. vortex*, L., and *P. albus*, Mull., were obtained; the first named being so corroded and worn as to be useless for the cabinet. Besides these, *Physa fontinalis*, L., and *Succinea putris*, L., were in some numbers. Around this pond our Entomologists had an opportunity to use their nets. Of the Odonata, of which Mr. Briggs has taken no less than twenty species from this neighbourhood, only two were seen, viz.: a few *Lestes sponsa*, and *Agrion puella* in some numbers.

Of the Neuroptera captured Mr. C. A. Briggs has kindly furnished the following list:—*Panorpa germanica*, L., *Hemerobius concinnus*, Ste., *H. inconspicuus*, McL., *H. nitidulus*, *H. limbatus*, Wesm., *Chrysopa aspersa*, Wesm., *C. tenella*, Schn.; and of the Trichoptera,

Limnophilus sparsus, Cur., *L. griseus*, L., *L. centralis*, Cur., *L. vittata*, Fb., *L. lunatus*, Cur., *L. marmoratus*, Cur. Of Lepidoptera, *Cataglyphis lemnata*, L., *Hydrocampa stagnata*, Don., and *H. nymphæata*, L., were all very common, and one specimen of *Chilo phragmitellus*, Hb., was captured. At the open end of the first pond one of the only two species of Rhopalocera seen during the day was first met with, viz., *Cænonympha pamphilus*, L. The other found later on was *Lycæna ægon*, Schiff.

Several tadpoles of the newt (*Triton* sp.) were pulled out, and the young of both the toad (*Bufo vulgaris*) and the frog (*Rana æsculenta*) were plentiful. The natterjack (*Bufo calamita*), which occurs there, was not seen. Perhaps I ought to have mentioned that the water boatman (*Notonecta glauca*) was very common; the Ephemera were also noticed, and some water spiders (*Argyroneta aquatica*, Clerck.), were obtained.

That grand piece of water, the so-called Boldermere Lake, had shrunk very considerably in size during the hot weather, and we were thus enabled to trespass on its muddy bed. There in profusion grew the marsh St. John's wort (*Hypericum elodes*, L.), and *Ranunculus flammula*, L., the lesser spearwort. In one pond several flowering spikes of *Sparganium ramosum*, Hud., were noticed, and a profusion of the barren fronds of *Equisetum limosum*, L., *Hydrocotyle vulgaris*, L., the pennywort, with its circular leaves, interspersed here and there with the purple flowers of the lousewort (*Pedicularis palustris*, L.), formed a beautiful natural carpet at the pond tail. In one part only did the bog bean (*Menyanthes trifoliata*, L.) flourish.

The banks of the large pond were very much overhung, and at one spot within less than a foot of where the water reaches was a flourishing colony of the wood ant (*Formica rufa*, L.). In several places large masses of *Drosera rotundifolia*, L. (the sundew), occurred, and *D. intermedia*, Hayne, was equally numerous. *Erica cinerea*, L., and *E. tetralix*, L., were in flower, but no *Calluna vulgaris*, L. Of *E. tetralix* several pure white varieties were plucked.

Among the first quantities of *Agaricus rubescens* were collected, and it was stated that *Boletus edulis* and *B. luteus* were to be found in the season.

Of ferns only *Lomaria spicant*, Desv., was reported; no doubt most have gone the same way as in nearly the whole district within twenty miles' radius of London, i.e., have been ruthlessly dug out.

A small pond, among other microscopical treasures, produced abundance of that wonderful colony, *Volvox globator*.

Perhaps the best lepidopterous species captured were *Lithosia mesomella*, L., among the heather, and a specimen of *Phycis fusca*, Haw. (*carbonariella*, Fisch.), in that portion of the wood recently burnt. *Boarmia repandata*, L., with a lightish band; *Cabera exanthemaria*, Scop., *Eubolia plumbaria*, Fb., *Nomophila noctuella*, Schiff. (*hybridalis*, Hb.), *Melanthia albicillata*, L., *Bupalus piniaria*, *Melanippe sociata*, Bork., *Larentia didymata*, L., and *L. viridaria*, Fb.

(*pectinitaria*, Fues.), were all obtained among the trees and undergrowth near the large lake. Specimens of *Retinia pinivorana*, Zell., and *Aplecta nebulosa*, Hufn., were seen, as well as *Tortrix forsterana*, Fb., and *Crambus pascuellus*, L., which latter laid a number of ova.

In close proximity to the Hut Hotel might be obtained plenty of specimens of *Planorbis albus*, Müll., and *P. lineatus*, Walk., with a singular var. of *Limnæa peregra*, Müll., while it was evident from the broken shells that the centre of the big water contained very large specimens of *Anodonta cygnæa*, L.

Several members heard the cries of the nightjar (*Caprimulgus europæus*, L.) and the corn crake (*Crex pratensis*, Bech.), while there was an abundance of nests of the house martin (*Chelidon urbica*, L.), under the eaves of the hostelry.

On the homeward journey, after an excellent repast, to which twenty-eight sat down, young larvæ of *Pygæra curtula*, L., and several batches of *Phalera bucephala*, L., larvæ nearly full-fed, were obtained, while the list of captures was augmented by *Hypena proboscidalis*, L., *Xylophasia monoglypha*, Hufn. (*polyodon*, L.), and *Rumia luteolata*, L. (*cratægata*, L.).

Our Coleopterists reported the capture of *Cicendela campestris*, L., *Melolontha vulgaris*, F., and several species of Coccinellidæ.

One of the Lycosidæ, or wolf spiders, was seen carrying its huge egg bag at high speed, most likely *Dolomedes mirabilis*, which species frequents such localities.

Silene inflata, Sm., was found in some quantity.

This may not have been a very brilliant meeting, looked at from the point of view of one avaricious for specimens, but I think that, like most of our excursions, it will be looked back upon as one of those days in our lives when we learnt a great deal of Nature's method, and when we were supremely happy in the close communion of those of like tastes with ourselves, obtaining true relaxation from various business cares, and seeing, by means of the glasses, as it were, of biological knowledge, much more in the world around us than the majority of those we jostled against by the way.

Report of the Fungus Gathering held at Esher and Oxshott, on October 13th, 1894.

By E. STEP. Read October 25th, 1894.

The Fungus Gathering of 1894 may be correctly described as the most successful yet arranged by the Society. It would have been difficult to find in any autumn a day more favourable for pleasant rambling in the woods in search of fungi. There was an absence

of wetness, yet following after a week of mild dewy nights the specimens were fairly abundant and in good condition. The experiment of arranging two different hours of departure was justified by the fact that when the morning party left Esher village it consisted of nine persons, and the afternoon train brought the total up to fifteen, of whom thirteen foregathered for tea in the evening.

The hunting-ground was the fir-woods lying between Claremont palings and Oxshott Heath. *Russula emetica* with its crimson pileus and stem was one of the first species to attract attention, and was found to be abundant throughout the day. The only other species of *Russula* that appeared to be at all abundant was the dingy yellow *R. feteus*, an evil-smelling species which is regarded as poisonous, though eagerly devoured by slugs.

Amanita muscarius was frequently met, but the specimens were not typical either in size or colour. None of the Amanitæ were abundant, but a few specimens of *A. rubescens* and *A. vaginatus* were bagged for the table, whilst the dangerous *A. phalloides* was seen and left severely alone. The pretty red form of *Clitocybe laccatus* was more plentiful than the violet form. Twigs were found upon which the delicate-looking *Claudopus variabilis* was growing back downwards. *Stropharia æruginosus* was common with its blue slime, making the yellow pileus appear green. *Cantharellus cibarius* was by no means plentiful, where a few weeks earlier it had been exceedingly abundant. The worthless *C. aurantiacus* was met as frequently; another member of the same genus was found with sooty pileus and gills, and tubular orange stems, and proved to be *C. tubæformis*. The two closely allied and toothsome species of *Clitopilus*, *C. prunulus*, and *C. orcella*, were abundant; *orcella* growing in large rings wherever the ground was fairly clear. Other Agarics found included the common *Armillaria melleus*, *Marasmius urens*, and *M. peronatus*, besides several that fell a prey to the maggots before I had time to identify them.

The Polyporei were represented by many species. Among the Boleti may be mentioned the poisonous *B. satanas* and *B. luridus*, both changing colour when the flesh is cut or broken; *B. bovinus*, with sticky yellow pileus and the tubes extending down the stem; *B. edulis*, whose name gives confidence to the inexperienced Mycophagist; *B. scaber*, equally good, and known by its rough stem; *B. luteus*, with its thick coating of umber slime and handsome frill, was not as common as I had expected. The large, rare *Polyporus schweinizii* was here abundant, growing apparently on the roots of pine; and the similar but smaller, softer, and more ruddy *P. rufescens* grew on stumps. Of the stemless species the common *P. versicolor* was, of course, much in evidence: also *Stereum hirsutum*, *S. purpureum*, and the swollen gelatinous *Auricularia lobata*. Several specimens of the rare *Hydnum imbricatum* were found, one of them being very large (seven inches diameter of pileus) and perfect. A

single specimen of the equally rare and remarkable *Tremellodon gelatinosum*, of the substance of pale blue jelly, was detached from a fir trunk ; and Mr. Turner brought us several masses of *Sparassis crispa*.

The smaller fry were frequent, and we gathered the pretty *Calocera viscosa* and *Clavaria tenuipes*, which grew abundantly in the short turf of open spaces.

Zygæna exulans, Hoch., var. *subochracea*, White.

By W. H. TUGWELL, Ph.C. Read October 11th, 1894.

At the previous meeting of this Society I sent for exhibition a selection of *Zygæna exulans*, captured during the week ending June 30th. I had intended to have sent with it a note explaining the exhibit, but unhappily for me I had a bad day of pain, that quite unfitted me for doing so, and the insects were sent alone. I heard that some discussion was raised on my exhibit by Mr. Tutt, but in the absence of my notes it was not so satisfactory as it might have been. That being so I venture to exhibit the specimens again, and also to make a few remarks thereon. The series, as it now stands, contains five rows of the June captured *Zygæna exulans*. The two rows on the left at bottom of the box are females, and the three rows on the right are males. These are all selected as the finest and brightest specimens of the Scotch form of *exulans* I have ever seen, and I may venture to say that I have had more of them through my hands than any other English Lepidopterist. I made my first acquaintance with *exulans* on July 10th, 1886, and I still recollect the pleasure I had at netting that first specimen, and the shout of joy I gave to my friend and companion, Mr. Lachlan Gibb, when I sung out, "I have got it!" As a trip to Braemar is both long and expensive, we were indeed fortunate in enlisting the aid of a local friend, who can occasionally get on the ground. To him we are indebted for the few fresh specimens which he so kindly sends us from time to time ; and by these means I have had a great facility of seeing and knowing thoroughly the full range of variation of the Braemar insect. That being so, I feel I may speak of it with some confidence, and I am clearly of opinion that the Scotch insect has most decidedly a sufficient local character to deserve a varietal name, and none could be better fitted than that chosen by Dr. White, who first discovered the species at Braemar, and gave it the varietal name *subochracea*. It is now nine years since I first saw it on its native mountain side, and from that time to the present season I have set some nearly every year, and know its variations

fully. At its very brightest, say those at bottom of box now exhibited, even they are dull-coloured in contrast with the Swiss insect. To complete my exhibition, I now add, at the top of the box, three Swiss examples. The upper without a body is a male, and the two lower examples are females, as may be seen by their cream collar and legs. On the right side of top of box I have placed four females of the extreme form of var. *subochracea*, two each of 1889 and 1891, and two males of this year's capture; also two pupa cases *in situ*, and may I ask a critical examination of these. First, take the great difference of colour, say with the three Swiss, and, say, all the five rows of Scotch at bottom of box. Note well the difference of opacity of the area of all the wings of the three Swiss as compared with the five Scotch rows, and particularly note the great difference in the length of hairs on the bodies of the Swiss females. These are females, as the cream-white collar and ditto cream-coloured feet prove; and compare the length of these hairs with that of the hairs of the Scotch females, the latter have sleek-looking bodies, whilst the Swiss have quite long-haired bodies, more like the Scotch males. This character, coupled with much more thinly-ranged scales on the Scotch females, always gives them a distinctly semi-diaphanous appearance, and is most striking when seen in a lot of them arranged together.

The Scotch females have a character that I miss altogether in the Swiss females, viz., the fringes of the Scotch females are pale whitish grey, but in the Swiss the fringes are black; and in the Scotch females the ridges of the nervures are covered with pale whitish grey scales, which when alive and in daylight is very distinctive looking; they have a powdered-looking appearance, as if they had been dusted with flour. And again, in the Scotch females the spots on superior wing are only red in the centre, the outer edges all being of a pale ochreous grey. Further, the hind-wings of the Scotch insect have a blackish tone, and a broader black border; this gives a dull look to this insect as compared with the brighter-coloured hind-wings of the Swiss.

The above differences are readily seen in any of the Scotch examples when compared with the Swiss, but much more sharply so when the *extreme* form of the Braemar var. *subochracea* is used for comparison.

Of course, in a lot of Swiss specimens I have little doubt but that some range of difference of coloration would be found, still I feel certain I could pick out Swiss from Scotch specimens without any mistake.

One very curious feature in the Scotch insect is the ready way in which it loses the little red it has on its emergence; a day or two seems quite enough to destroy that. It fades away during life sooner than any insect I know of, certainly much more rapidly than in any other British *Zygæna*.

I never saw the Swiss insect alive, but the few I have had over

twenty years are still much brighter in colour, more densely scaled, and have much longer hairs on the bodies, particularly of the females; so much more so than any Scotch female can show, that I cannot but feel that the Scotch insect is well deserving of its varietal name. This should be readily disproved if the Swiss insect can be produced of the form shown by the Braemar. Mr. Tutt can possibly do so, but if I were to prophesy I should say he will not be able to.

The Scotch insect, to my way of thinking, is a weakly race, as evidenced by the tendency to albinism, and this is proved by the failure of pigment colour, the reds failing, and pale white grey tones taking their place. This is strikingly so with the females of the Braemar insect.

Zygæna exulans, Hoch., and its varieties.

By J. W. TUTT, F.E.S. Read October 11th, 1894.

Probably no species in this genus is more interesting to British collectors than *Zygæna exulans*. Discovered as a British insect, near Braemar, many years ago, by Dr. F. Buchanan White, the locality was afterwards visited by Messrs. Tugwell and Lachlan Gibb, and some of the captures of these gentlemen gradually found their way into our cabinets.

The first British specimens of *Zygæna exulans* which came into my possession were received from Mr. Tugwell in 1886. The insect at that time was a great desideratum, and I was very thankful for specimens not in the very best condition. They were somewhat rubbed, and agreed excellently with Dr. White's definition of what a Scotch *Z. exulans* (a somewhat diaphanous form) should be, and evidently belonged to the variety specially created for these rather rubbed specimens, viz., var. *subochracea*. Since then, however, Messrs. Reid, Horne, and others have put up on the ground for a considerable time, and for some three or four years in succession, so that gradually a great change has come over our notions of how really fine Scotch *Z. exulans* ought to look.

Soon after I obtained my first British specimens of *Z. exulans* I received some examples captured in the Swiss Alps, from Dr. Staudinger and Professor Blachier of Geneva. These were comparatively finely scaled insects, and, as far as I could judge, were largely females, although without the pale nervures that the females of the Scotch specimens (even in much poorer condition) exhibited. With these Swiss specimens, which I assumed to be the type, I was quite satisfied that the Scotch form was a very good local race. But my assumption as to the Swiss specimens being the type led me to

Staudinger's "Catalog," where I found that the synonymy ran as follows :—

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| <i>Zygæna exulans</i> , Hochenwarth and Reiner, Bot. Reisen, 1792, p. 55, T. vi., 1* ; Esp., 41, 1-2 ; Hb., 12, 101 ; Bdv., Mon. Zyg., 3, 3 ; Ic. 54, 4-5 ; Frr., 200, 2 ; 590, 1 ; Dup. II., 5, 5 a.b. | Summæ Alpes ; Pyrenees. |
| a. v. <i>vanadis</i> , Dalman, Zyg. Suec., 223, 6 † | Lap. ; Scand. Mont. |
| (parcissime squamata, albo non mixta). | |

This was particularly interesting : "Thinly scaled and not mixed with white," was the diagnosis of var. *vanadis* ; therefore I was led to infer that the type must be well scaled and mixed with white. My Swiss specimens were well scaled and not mixed with white, whilst my Scotch specimens were poorly scaled (probably rubbed), but two specimens had traces of pale nervures and pale thoracic patches, which might be considered as being mixed with white.

This appeared to be very clear, since everything was exactly as it should not have been, according to what I could glean from Staudinger's "Catalog," and I remained in this uncertain condition of mind until about two years ago, when I first carefully examined some fine Scotch specimens, and discovered that they presented a clear and definite sexual dimorphism, the females being more thinly clothed with scales, the thorax mottled with pale yellowish or whitish and pale nervures, extending from the base to beyond the discal cell. From this it appeared that there were two distinct forms—(1) A bright-coloured Swiss form, the females apparently without white nervures ; (2) A darker-coloured (Scotch) form, showing fairly defined sexual dimorphism.

Joining Dr. Chapman at Chambéry, towards the end of last July (1894), one of the first insects he showed me was a grand form of *Z. exulans*, with orange-coloured nervures and orange mottled thorax. Very fine and beautiful this form was, and scarcely recognisable as *exulans*. The specimens I exhibit.

About a fortnight later we met with the species above Gimilian, in the Cogne valley. These specimens, which were absolutely identical with Scotch specimens, I also exhibit.

A few days later the species was met with again ; this time in the Lauzon valley, on the zigzag path which leads to the King of Italy's shooting-box, well up on the way to the Col that leads into the Val Savaranche. These very closely resembled the specimens which Dr. Chapman obtained at Lauteret. These specimens I also exhibit.

It will be noticed that no ordinary Scotch specimens could be possibly confounded with either the Lauteret or Lauzon specimens.

The last capture of this species was made up the Grauson Valley,

* This should be *Zygæna (Sphinx) exulans*, Hochenwarth. Reiner and Hochenwarth's Bot. Reisen, p. 265 ; Pl. 6, fig. 2 (1792).

† This should be *Zygæna vanadis*, Dalman, Kongl. Vetensk.-Ak. Handl., 1816, p. 223.

where Dr. Chapman met with the species in large numbers. He very kindly handed over all his captures to me, and when they came off the boards I found I was in possession of a very fine series of rather more than seventy specimens. A fair selection of these I exhibit to-night. It will be noticed that among them the distinct sexual characters exhibited by the Scotch specimens break down, and that some of the males are inclined to show traces of the pale markings we have learned to attach to the female sex.

I would specially call your attention to the first fifteen specimens on the lower side of the box. These are made up of Scotch, Cogne Valley, and Grauson Valley specimens mixed, and they show no difference whatever, either in tint, coloration, or size. In fact, whatever name must be applied to the Scotch specimens must be applied to all the insects in this part of the exhibit; yet you will observe that the specimens following these gradually develop into strongly marked forms, differing but little in their extremes from the Lauzon specimens.

I have mixed the insects thus, because I know the usual antipathy there is among British collectors in accepting any Continental form of a local British species as similar to and identical with our own. I remember, on the occasion of an exhibit in this room, where two series of the same species of insect, from different localities, were mixed up to show how identical the forms were, that a prominent member of this Society said he could see a great difference in the specimens, selected the two sets correctly, much to the astonishment of many other members, who agreed with the exhibitor as to the identity of the forms, and who afterwards candidly told me that he had been able to select them because one lot were on gilt, the other on white pins! I can assure members present to-night that these specimens of *Z. exulans* are not to be thus separated, and that the insects set on black pins are not all Scotch, nor those on white pins Piedmontese specimens. I shall be pleased to point out which are Scotch and which Piedmontese to any member after the meeting.

This part of the Grauson Valley and Cogne Valley specimens are identical with the Scotch. It will be remembered that so far as characters go, Dr. White considered the Scotch specimens intermediate between the type and the var. *vanadis*. But Dr. White, like the rest of us, considered the bright Swiss specimens the type, an error which may easily be proved by reference to the original description. In fact, (1) the type; (2) the Cogne, Grauson, and Scotch specimens; (3) the var. *vanadis*, from Lapland, are so closely united that one hardly knows how to separate them. Evidently the *vanadis* of the Lapland authors, Dalman, Zetterstedt, etc., is simply the female of the dark forms of *exulans*, the male being called by these entomologists by the latter name. Dalman compares the colour and position of the red spots with those of *Z. loniceræ*, the only moderately common *Zygæna*, it would appear, then known in Scandinavia. If, however, these are to be separated at

all, then the brighter Grauson Valley specimens will represent the type, whilst the name *vanadis*, must be retained for the darker Grauson Valley, the Cogne Valley, the Scotch and Lapland specimens. It seems even, then, rather a case of splitting straws. One thing is certain, the Scotch name *subochracea*, White, must sink in favour of *vanadis*, Dalman. It may, of course, be urged that *subochracea* is a well-known name in England; in fact, the only varietal name known. Against that I would urge that Dr. White was uncertain that his form was not *vanadis*; that this particular varietal form is distributed in all the Continental collections under the name of *vanadis*, and that the latter name has priority by nearly three-quarters of a century. The examination of a number of Lapland specimens amply confirms this conclusion.

Insensibly as the various forms lead into one another, yet there can be but little doubt that each particular locality gives some little detail of character, that makes the study of this species exceedingly interesting, and I have no doubt that almost every valley in Piedmont, Savoy, and Switzerland, where *Z. exulans* occurs, would give us a race that in some minor details would interest us, and show us some little difference from those found in the neighbouring valleys. But most interest attaches to our Piedmont captures among the specimens that I exhibit to-night, in the fact that they agree almost identically with the Scotch specimens which we have so long learned to look upon as being something exceedingly different from those of Switzerland and Continental Europe generally.

Zygæna carniolica, Scop., and its varieties.

By J. W. TUTT, F.E.S. *Read October 25th, 1894.*

At the foot of Mont Blanc (on its Italian side) lies Courmayeur, the queen of all Italian summer resorts. Everywhere around the eye rests on snow-clad mountains, mighty glaciers, turbid torrents, and magnificent cataracts, whilst the village itself, with its quaint Swiss roofs, narrow streets, and palatial hotels, combines in a wonderfully happy manner the beauty of the old with the comfort of more modern tastes.

Below Courmayeur runs the lovely Dora, here skirted with emerald meadows, there hurling its waters through a deep and rocky gorge, then dashing through a walnut grove whose lovely foliage filters the bright rays of the sun and makes a welcome shade. Behind Courmayeur the cultivated patches, with their saxifrage-covered stone walls, extend up to a long sweeping belt of larches, the lower margin here of the pine district, which goes on and on up the steep mountain sides until the grim and iron hand of the snow god saps their vitality and crushes out even their life in the

regions of perpetual snow. Along the lower edge of the larches deep alleys extend up the slopes, making charming clearings in the woods—clearings which are a perfect paradise to the naturalist. Filled with waving umbellifers and hardy grasses, luxuriant with the beautiful bright tints of Swiss flowers, these charming Swiss wild-flower gardens are the haunts of butterflies innumerable, of rapidly-disappearing lizards, of myriads of ants whose labours and wonderful instincts puzzle the human mind by their insight and sagacity. How gay the butterflies are! How eagerly do they, in company with the brilliantly coated Burnet moths, dive deep into the flowers and gather the luscious honey as payment for the work of fertilisation they perform!

One of these charming hollows quite near Courmayeur was a veritable pleasure haunt of Burnet moths. No less than six species lived here in amicable and moral neighbourliness, and of these species the palm for beauty and variety must undoubtedly be given to *Zygæna carniolica*. A fine conspicuous fellow you will say *carniolica* is when you inspect it in a collector's box, its outspread wings displaying maybe its brightest tints, yet lacking the wonderful charm which all our insects have when considered in relation to the flowers on which they rest; but it required an entomologist to detect it, and then not always readily, as it clung close to the capitula of knapweed or scabious, and shyly put its long tongue over the edge of the flower and rifled the florets of the stores they had to yield. When, however, the sun shone hotly, and *carniolica* was really alive, then it was indeed a treat to see the beautiful creatures in their true forester livery of green and crimson, hurtling along like nothing but a Burnet moth, or with booming buzz climb frantically round and round or over and over a flower on which they had alighted. Sometimes, too, a lady, snugly hidden in the herbage, attracted a buzzing crowd of suitors, who showed off their graces in true cavalier fashion in order to win the lady's love.

But besides the beauty that *carniolica* added to an already charming landscape, it proved from the fact that the specimens varied so much of the highest possible interest to us as naturalists. Here is a magnificent fellow! Let us look at him. A real Burnet you observe, with deep green or blue ground colour, two red basal spots, two central spots, and one spot where the outer one is placed in our British *Z. trifolii* or *Z. loniceræ*, but in addition we find a sixth spot, not round like that in *filipendulæ* nor placed in the same position, but a long spot extending almost transversely across the wing, near and parallel to the outer margin, so that there are the five ordinary spots of a British "five-spot" Burnet, with a long linear spot outside them all. The hind wings, too, are characteristically "Burnet," with their crimson colour and dark green margin.

Yet, to the naturalist, a rapid glance is sufficient to show that there exists among the specimens a great deal of variety, and if one may compare the beauty of individuals where all are so beautiful,

different degrees of beauty also. Here is a specimen with each of its six red spots surrounded by a broad ring of a marvellously delicate shade of yellow or rich cream colour. "*Alis anticis maculis latius flavo-cinctis; abdomine annulo rubro,*" is Staudinger's description of this form, Scopoli's type of the species and the *Z. onobrychis* of many other authors. No need to ask why *onobrychis* was chosen, for the plant of this name with its pretty compound leaves is in abundance among the gentians and knapweeds here. This type has a wide distribution—"Central and South-Eastern Europe, Italy, Asia Minor, Armenia, Hyrcania and Altai," is Staudinger's rather comprehensive range. We saw it in all the Savoy and Piedmont valleys we visited. Low down at Bourg St. Maurice and near Aosta; high on the pass of the Little St. Bernard; some 7000 feet above the sea on Mont de la Saxe, and at nearly the same elevation near Chevanis, show that its range in altitude is almost as great as its range in longitude.

Side by side with the fine cream-ringed type was Herrich-Schäffer's ab. *diniensis*. This is a true aberration occurring apparently everywhere with the type, and not forming a local race or variety apart from it. The yellow rings are much narrower, and as Staudinger says, "*Maculis rubris permagnis, anguste flavo-cinctis.*"

But more abundant than either the type or ab. *diniensis* is Hübner's ab. *hedysari*, in which the abdomen is without the red ring and is totally black. This black-bodied form varies much in its spotting, sometimes having the red spots well ringed with yellow, at others with a much less quantity. Staudinger says, "*Maculis rubris parvis, flavo-cingulatis; abdomine toto nigro.*" I do not know why Staudinger connects the form with a black abdomen with the possession of small red spots. I have not been inclined to link them thus in my examination of them.

Considering this as a parallel form (but with black abdomen) to the type, there is a form, var. *intermedia*, which has very narrow cream-coloured rings, and may be looked upon as holding a similar parallel relationship with ab. *diniensis*.

Another very fine form also occurred, called by Staudinger *berolinensis*. It occurred with us as a rare aberration, being occasionally met with in all localities where we found the more yellow-coloured forms. Staudinger considers it as a local race, as well as an aberration; but we did not find this form of the species localised anywhere in our collecting grounds, unless it was at Chevanis, but we captured too few there to form an opinion. The diagnosis of Staudinger is short but very apt: "*Maculis rubris non flavo-cinctis; abdomine toto nigro.*" He localises it as a variety or specialised race in "Northern and Eastern Germany"; as an aberration in most other districts with the type.

Among the minor points of variation we noticed in our captures was a tendency to vary much in the quantity of grey scales on the thorax; a tendency for the central pair of spots to coalesce;

for the longitudinal spot to become obsolete or to lose its cream cincture earlier than any other spots, the other outer spot losing its pale cincture before the second pair. In two of the small Bourg St. Maurice specimens there is a tendency for the spots to be connected by pale cream-coloured nervure lines; there is also a tendency to develop an orange patch at the base of the hind-wings.

Another local race is called by Staudinger var. *græca*. This he confines to "Greece, Asia Minor and Syria." The diagnosis—"maculis rubris anguste albo-annulatis; abdomine annulo rubro"—is perhaps hardly applicable to any of our forms, but some have narrow red spots, and the circumscription is nearly as much white as yellow.

One aberration of Staudinger's we do not seem to have captured or noticed; this is Esper's *flaveola*. I have not seen Esper's figure, and Staudinger's diagnosis, "aberratio flava," is very vague. Does it mean the ordinary red spots are entirely yellow? If so, although we got some where the red was reduced very much, we evidently failed to take this form.

A local race, named *wiedemannii* by Ménétrières, occurs in Turkey with the abdomen entirely red—"abdomine toto rubro" is Staudinger's description of this variety.

A very interesting species, it must be confessed, is this insect to the naturalist, whether he be hunting it on the Swiss mountain sides; watching its brilliant beauty as he laves his hands in a cold, cold glacier stream or lies in lazy enjoyment beneath the larches; or even if he be in his study trying to unravel one of the many riddles which Nature is always presenting to us among these variable children of her beautiful creation, and which this charming species in no wise lacks when we make it the object of serious study.

Zygæna achilleæ, Esp., and its varieties.

By J. W. TUTT, F.E.S. Read November 8th, 1894.

In my paper on *Zygæna carniolica*, I referred to the excellent morality which, so far as Dr. Chapman and myself were able to observe, existed among the *Zygænas* in those charming clearings among the larch woods at Courmayeur. Not that some of them did not come under suspicion as a result of our somewhat close inspection and general examination of their morals, but so far as our observation went we saw no case of inter-crossing among the various species.

The insect about which we were most in doubt was perhaps *Zygæna achilleæ*, which, from its great general resemblance to *Z. pilosellæ* (*minos*), and on the other hand its nearer approach to a five-spotted insect, led us to suppose that our first captures were in some

way hybrids between *Z. pilosellæ* and we did not know exactly what. So strongly was this impressed upon us that throughout our stay we called the insect, *pro tem.*, as we did not know its correct name, "*Zygæna hybrida.*" But our suspicions proved to be altogether baseless, and we finally came to the conclusion that *Z. achilleæ* was as morally pure as its relatives which haunted the flowers and fought with it for a place at the honied treasures to be found there.

By no means so variable a species as some of its congeners, *Zygæna achilleæ* was also more restricted in its range. Except in the flower-besprinkled openings in the larch woods, beneath the arching boughs that rise up and up the steep mountain slopes, we did not meet with the species, but there we found it in great abundance. They were not in tens but in hundreds, perhaps in thousands.

A quiet retired Burnet is *Zygæna achilleæ*, not at all like the assertive bundling *Z. filipendulæ*, who will force himself on our attention, but a quiet insect that loves to rest in ease and retirement, and which, in spite of its bright colours, is able when its bright scarlet hind wings are covered, to rest well on the top of the flowers of many different kinds of plants without exposing itself too freely to the gaze of the rude and inquisitive eye. Its colours in some way do not appear so conspicuous as do those of others of its near relations. Inconspicuous colours! you exclaim, then it cannot be much like a Burnet moth. But it is though. A fine typical Burnet moth, with the characteristic five red spots—two at the base, two in the centre, and one towards the tip of the wing. But this outer spot is a strange one. It is large and expanded, almost as if it had joined a spot similar to the transverse streak which occurs in *Z. carniolica*, and then being ashamed of its bright tints had in its modesty restricted it as much as possible, but still left a rather large addition to the round spot we are accustomed to see near the apex of the wing. The moth is not always too strongly scaled either, and in this respect reminds one of *Z. exulans*, and, like the latter, it varies much in the intensity of the colour and in the closeness of the scales; like the latter, too, a great deal of the difference appears to be sexual, the females being more thinly scaled than the males. The female also is of a rather different tint, being much more bronzy than her lord and master, and hence there is very fairly defined sexual dimorphism in the species. I once saw a female *Z. achilleæ* drying its wings, and I took a lazy fit, sat down among the trefoils and gentians by the side of a barberry bush on which the glowing fuchsia-like fruits hung pendent in brilliant beauty, to watch it complete the operation. The wings hung down limp and flaccid with the moist fluid between the upper and lower membranes of which the wing is formed. Soon the fluid disappeared as coagulation set in, the wings became stiffened, and slowly they were folded back over the insect's body. How lovely were those wings! The bright crimson spots were set in a lovely

bronzy green frame, the green covered with the tiniest and most sparkling particles of gold that can be imagined. Dried insects in cabinets are beautiful, but how much more beautiful is the enchanting loveliness of these magnificent creatures in a state of nature, where the green leaves act as a setting to a brilliant jewel, and the shimmering sunlight falls in golden drops, making the metallic particles on the wing sparkle with the concentrated brilliancy of the sunlight itself. I could not kill that insect. I had already received from it one of the best lessons in natural beauty that I had ever received. I knew that if I killed it, its tender and absolute perfection would fade, and reference to the dead body might make me some day believe that I had overdrawn the picture. I preferred to let it leave its mark on my memory, indelibly fixed there by virtue of its retiring and modest loveliness, and to carry away my first and truest impression of its beauty.

Let us look at these red spots on its wing a little more closely. The top spot at the base is a rather long one, extending between the costal and the subcostal nervure, and having a tendency to stretch along to join the top spot of the middle pair, but the dark green subcostal nervure does its best to prevent it from doing so. The lower spot of the basal pair is long and rather oval in the specimens which are marked the most clearly, and which show the least sign of blotching; whilst the lower one of the middle pair is also a rather long oval blotch. Separate enough as these two lower spots are in most specimens, yet you may observe that there is a tendency in others for them to unite and form a longitudinal blotch along the centre of the wing. In some specimens, too, it will be seen that there is an attempt made by the upper spot of the middle pair to unite with the outer spot, an attempt which is occasionally successful.

What an excellent lesson this teaches us! All these attempts made in various individuals rarely come to a head in the same specimen. But let us look for a moment at *Zygæna pilosellæ*, a near relation. Compare it with *Z. achilleæ* carefully. There is the same longitudinal character about the upper of the two basal blotches. There is the same bulky blotch towards the apex of the wing, identical in shape in both species; but in *Z. pilosellæ* the union of this outer blotch with the upper spot of the central pair, thus forming a longitudinal blotch, is the normal character, as is also the union of the lower spots of the basal and middle pairs into a second longitudinal blotch; so that in *Z. pilosellæ* we get the long costal spot starting from the base; a second blotch, formed by the union of the upper middle spot with the outer one; and a third, formed by the union of the two lower spots. The characters, therefore, that occur as an occasional form of variation in *Z. achilleæ*, and never, so far as my observation has gone, with all the variable characters developed in the same individual, is the normal condition in its relative *Z. pilosellæ*; and in whatever way the scientific enquirer

may look on the chief features exhibited, whether as presenting an attempt by *Z. achilleæ* to reach a form like *Z. pilosellæ*, supposing the latter to be the more highly developed form which has arisen from an older spotted insect, or on the contrary as an attempt in *Z. achilleæ* to revert to an ancestral condition more nearly represented now by *Z. pilosellæ*, if the latter be the older form—it really matters little. The line of evolution in either direction is as interesting one way as the other, and the variation of *Z. achilleæ* shows positively either that it is attempting to reach *Z. pilosellæ*, or, having once been like *Z. pilosellæ*, is attempting to throw off the old shackles and become a five-spot, occasionally, however, reverting to its older form.

We see, then, that the spots of this Burnet moth are not uniformly separate and distinct, but have a tendency in many specimens to extend themselves so as to unite in pairs, the two upper and outer with each other, the two lower with each other. Occasionally they succeed in doing this more or less, and then it is difficult to say where *Z. achilleæ* leaves off and *Z. pilosellæ* commences. Some of the forms exhibited show this tendency markedly. I think, then, that our study of the general variation of *Z. achilleæ* forces one conviction very strongly upon us, and that is that it is nearly related to *Z. pilosellæ*. Taking the characters altogether, this relationship seems to be very close indeed.

According to Staudinger, Esper's type of this species has a very considerable range. He gives in his "Catalog:" "Central and South-eastern Europe, Northern Italy, Helvetia, Bithynia, Pontus, Armenia, Syria, Siberia." I am not altogether certain that my specimens are of the type form, for Staudinger gives Hübner's *bellis* as the form inhabiting the "southern Alpine valleys," and describes it as "major obscurior."

As may be seen, the male specimens which I exhibit are of a rather dark green tint, not unlike our Scotch *Z. exulans* and those from the Val Grauson. Perhaps then there is a brighter form which I do not possess. These specimens from Courmayeur, whether they be the type or var. *bellis*, belong undoubtedly to a very specialised race, with no colour aberration worth speaking about. I exhibit specimens of this species received at various times from Continental collectors. These came from the Jura Mountains and Hungary.

Hübner describes a form named *viciæ*, which Staudinger diagnoses as "maculis minoribus, macula externa rotundata." This, according to Staudinger, is an aberration and not a local race. There is, as may be seen, considerable variation in the size of the spots and the rotundity of the outer spot, but there seems to be every intermediate grade in the specimens I exhibit. Lastly, Ménétrière describes a yellow variety from the south-east of Armenia under the name of *bitorquata*, and diagnosed by Staudinger as "*alis anticis flavicantibus*." I have seen specimens bearing this name in the British

Museum collection. They are of a bright golden colour, and are extreme females strongly dusted with yellow scales.

I trust, Gentlemen, that I have interested you in *Zygæna achilleæ*, that I have made you in some small degree realise and understand (have called to mind perhaps some parallel case in your own experience) the exquisite pleasure I felt when studying *Zygæna achilleæ* in those scented vistas which stretch up among the larch trees, whilst the warmth of barred sunshine, filtered through the velvet canopy overhead, made a delightful spot still more lovely and enchanting, whilst the green banks swept down in emerald undulation to the rapid Dora, whose distant hum murmurs even now perhaps on the ear in the stillness of the scent-laden air, and where the naturalist can pursue his studies and dive into the recesses of Nature in a land which has not yet been captured by the few, who close to the many some of Nature's most glorious heirlooms and gifts to all her children, where that curse of the naturalist has not yet been formulated—"Trespassers will be prosecuted."

Zygæna transalpina, Esp., and its varieties.

By J. W. TUTT, F.E.S. Read November 22nd, 1894.

Probably the most beautiful of the six-spotted Burnet moths is *Zygæna transalpina*. In the early morning, when the sun has just worked his way upwards sufficiently to send his oblique rays glancing through the tops of the larch trees, and to form fine pencils of light on the flowers and grasses in the hollows, is the time to see *Z. transalpina*. At that time the pupa pushes its way out of its yellow, boat-shaped silken cocoon, and dehiscing in genuine Burnet fashion, allows the strange, soft imago to creep out. The latter rapidly walks up the stem of larch or juniper, hazel or barberry, on which the cocoon has been spun, and hangs down its limp wings; these rapidly expand, and in a few brief minutes become an epitome of brightness and brilliancy.

Few Burnet moths attain such a perfection of rich purple, or such a marvellous depth of beautiful green. This differentiation of the ground colour is largely sexual, the gentlemen being clad usually in the purple, the ladies in the dress of verdant hue. But fluctuating and changeful are these colours, and green becomes purple and purple green, as the rays of light fall at different angles upon the scales. You scarcely believe it? Look at the insects, as with their heads straight towards you, and males and females alike are of the richest metallic purple. Now turn them round, with their heads from you, and they become changed to a metallic green. But as you vary the angle you soon discover that normally some are purple, others green, and that largely this is a matter of sex.

Let us examine the spots of *Z. transalpina*. Six lovely crimson spots, set in a framework of purple or green. What richer contrast can be desired! Six spots in three pairs, just as in the common *Z. filipendulæ*, and it would puzzle one to describe exactly in words how this species differs from *filipendulæ*. Yet it does differ from it, and very considerably too. The deep brilliancy of its purple or green ground colours, its bright crimson, the clear line of demarcation, almost as if a dark line had been drawn around them, separating the spots from the ground colour, mark this species off distinctly at once. The basal pair of spots are both small; the upper one occasionally sends out just a little pointed spur, but this never reaches the length which is normal in *achilleæ*, *pilosellæ*, or *exulans*, and which occurs occasionally in our British *Z. loniceræ*. The middle pair of spots, too, are very constant, both in size and position; they are usually well separated, but occasionally are closer together, but never actually join; the subcostal nervure always passes through the upper spot, and is not restricted to the space below, as is usually the case in some of its relatives. In the outer pair of spots, however, there is considerable variation, and to them we must now pay a little attention.

You all know that occasionally our common six-spotted Burnet (*Z. filipendulæ*) produces an aberration, which has once or twice been referred to a form known on the Continent as *ochsenheimeri*. This form has the sixth spot (the lower one of the outside pair) ill-developed and smaller than usual; but in *filipendulæ* this character is only of occasional occurrence, and is never present in all the insects in any given locality; it is very uncertain in its appearance, and frequently does not occur in a district at all. Now, our more modern ideas of the evolution of species have led us to suppose that, given a large number of closely allied species, each with normally constant characters, the various characters of the allied species will occasionally appear as a chance reversion or sign of progressive development in any of the species. We have Burnets with five spots only, on both upper and under sides; Burnets with five spots on the upper and six on the under sides; other Burnets with five large and one (the lower of the outer pair) small spot on both sides; whilst others have six well-developed spots. We expect, therefore, to find occasional specimens of any given species showing the characters of the allied species, and so it is; and it is these tendencies to reversional (or developmental) aberration that present, even to the most observant and best informed specialists, serious difficulties oftentimes in correctly naming allied species.

Now, *Z. transalpina* exhibits this tendency remarkably well. It is a species with six spots, which are usually well developed; but on the other hand, in a fair percentage of its specimens, the sixth spot is considerably less in size than is normally the case. From Staudinger's "Catalog" it would appear that this is more usually the case in some districts than in others, for, it seems that in many

localities, instead of the sixth spot becoming small by degrees and beautifully less, until it forms an almost obsolete quantity, the fifth and sixth spots are well developed and joined into a large blotch. In such localities, where the six spots are large, and this tendency of the outer pair to approach more nearly together, or to become confluent is exhibited, the race is known by the name of *hippocrepidis*, a name first given to this form by Hübner, and diagnosed by Staudinger as:—"Alis anterioribus, subtus fere totis rubris; maculis 5 et 6 sæpius confluentibus; maculis et alis posterioribus cinaberinis."

In looking through the material in the collection at the British Museum, I found that there has been an attempt to separate these forms; but as a result no real differentiation has been made, nor, perhaps, is an exact one possible, for, as will be observed, my specimens, which were taken in the neighbourhood of Courmayeur, exhibit every variation, from that in which two large outer spots (5 and 6) are almost united, to that in which 6 is almost obsolete.

I have before made some comparison between *Z. transalpina* and *Z. filipendulæ*, and have pointed out that the two species, though somewhat alike, are to a specialist very different. But the most marvellous difference between these species is on their under-sides. In *transalpina* the small crimson spots of the upper-sides become changed into longitudinal red streaks, which in some specimens spread over the whole of the fore-wings, making their under-sides entirely red. This tendency to become red on the under-sides is the more interesting because it is not produced by the union of the spots, as are the blotches on the upper-side of such a species as *Z. pilosellæ*, but by the ground colour in the centre of the wing throughout its length becoming crimson, the bright colour spreading out from this central area and enveloping the spots as it spreads.

Staudinger gives as the range of the type, the "Southern Alpine valleys (Styria, Carniola, Helvetia, Piedmont and Gallia); and Etruria (on Speyer's authority)." The range of *hippocrepidis* is given as, "Central and South-west Germany, Central and Southern Gaul, Belgium, (?) Piedmont, South Sweden doubtful (on the authority of Wallengren)." It is very evident from my captures that the form *hippocrepidis* occurs in Piedmont. It is also certain that in the Piedmontese valleys it occurs freely with the type, so that though it may exist separately as a variety (or local race) in some localities, yet var. *hippocrepidis* occurs with and as an aberration of *Z. transalpina* in Piedmont at Courmayeur, Chevanis and Lauzon. I also exhibit, besides my own captures, specimens of *hippocrepidis*, taken near Geneva, and given to me by Professor Blachier, as well as Helvetian specimens both of *transalpina* and *hippocrepidis*.

You will observe in my box, specimens captured near Courmayeur, in which the crimson colour has been replaced by a more pinkish hue, inclining to orange. It may be well, for reference, to call this aberration *pallida*. It is not an uncommon form of variation in

Burnet moths, and is probably the first step in the genetic sequence of colour towards the yellow Burnets one frequently finds. Exposure may increase the pallor, but it certainly is not the first cause of it. The primary cause is undoubtedly pathological.

Transalpina, however, is not a species which in the true sense of the word varies. Its beauty lies in the depth and intensity of its colouring, which sparkles with metallic brilliancy in the sun, changing with every movement—the iridescent beauty of green for purple, of purple for green. I have before said that early morning is the time to see this fine insect. Burnets, I know, can always be found on the flowers when the shadows of evening are falling, but then they have had a rough day's work, made love perhaps, fought their real or mimic battles, hustled one another for a sip at the nectar of the flowers; dived their heads into out-of-the-way corners to carry pollen and to fertilise the flowers they rob, and their condition is thus less fine, their beauty less fresh, than in the early morning. Then when the dew yet hangs upon the grass, breaking up the slanting rays of light that pierce the bright needles of larch, or the darker ones of fir, which in their turn change the dew into matchless gems reflecting in thousands of sparkling beams their rainbow hues, the lovely Burnet *transalpina* must be owned to be unequalled by any rival, and must be held to be a fitting inhabitant of the incomprehensibly charming nooks which the Swiss valleys so frequently give us.

Zygæna medicaginis, Bdv., and its varieties.

By J. W. TUTT, F.E.S. Read December 13th, 1894.

A thin coating of fresh snow on the mountains all around us, a feeling of chilliness as great masses of cloud roll over the mountain peaks and envelop every now and again the cosy hospice in the pass of the Little St. Bernard, are almost all that is left to remind us of the magnificent Alpine storm through which we passed as we ascended on the previous night.

Such a storm! An impenetrable mist of blackest hue; thick vapour, causing a darkness which may be felt, envelops everything; vivid sheets of lightning stretch from peak to peak—no short fleeting line of light, but flashes that stand out in exquisite brilliancy against the black sheet of cloud yonder, a zigzag line which lights up the scene with vivid grandeur, a photograph on Nature's grandest scale; all around the reverberating peals echo and re-echo from abysmal depths, causing the rocks to tremble, and raising for a moment in the mind a sense of the greatest insecurity as the horse toils wearily along up the narrow path of the pass, below which falls, black and gaping, a yawning abyss of unfathomable depth, in which the demons of cloudland are now

carrying on a frantic orgy, enticing, it would seem, the plucky animal to take that one false step which would in a moment hurl three human beings into eternity. After all, though, the mind is too profoundly affected with the majestic grandeur of the scene to feel, for more than a moment, the slightest trace of fear.

But the horse did not swerve and I have had a good night's rest. My boxes are out, and here some fine large Burnet moths recall to mind the powerful sun, the flower-lined banks, the charming scenery through which the early part of our ascent was made. For the grand storm came at the end of a glorious day, when we had already been some seven hours making the ascent of the mountain along the zig-zag path, which leads from Savoy into Piedmont. At a height of some two to four thousand feet, passing up this ascent to the Little St. Bernard Pass, where the lovely Isère Valley, with its guardian mountain ranges on either side, spreads out like a scene in fairy-land, I first saw, on July 29th, living specimens of the insect which is called by Staudinger, *Zygæna trifolii* var. *dubia*. Staudinger first called this grand insect by this name, in his earlier "Catalog" (p. 21), published in 1861, and diagnosed it as "var. major, alis anterioribus maculis, 5 vel 6; alis posterioribus latius nigris." But some nine years before, in 1852, Lederer had called this species *medicaginis*, a name given to it by Boisduval as early as 1829, and for reasons which I will explain presently, I prefer to call it by this name.

My first acquaintance with this species was the finding of a couple of specimens in Coverdale's collection labelled "*trifolii* var. *dubia*; Val Vedro." The absolute separation of the central pair of spots, the small size of the upper spot of this pair, the long pointed wings and pointed antennæ struck me much more as characters of a species allied to *loniceræ* rather than to *trifolii*. But I got no more specimens except a couple sent to me by Professor Blachier, until I saw it in comparative plenty clinging, as I have just said, to the flowers on the roadside as we made the ascent of the Little St. Bernard. These living specimens made a great impression on me. I felt convinced, from their habits and general appearance, that they were not specifically identical with the species that we know in England as *Z. trifolii*.

The day following the storm we made the descent of the Pass into Piedmont. As we reached the lower levels (some 5,000 feet above the sea), this species began to appear again on the flowery banks that skirted the roadside, and continued to do so more or less abundantly until we reached the archway through the Crammont that leads into the Dora Valley, just above Pré St. Didier. Everywhere by the roadside among the towering mountains, they hung on the flowers, and the different conditions under which the species existed from those under which *Z. trifolii* is found, made me still more sceptical as to their identity, and I felt pretty well satisfied that my first impression was the correct one.

If you were to ask me to define exactly why I considered that this moth was not a variety of *Z. trifolii* I could hardly tell you. The points were such as strike a specialist, but are not very clearly capable of definition, but this is the case with many well recognised species of Burnets. I know the great variation in size which exists in *Z. trifolii*, and although the largest of our *trifolii* are but as pigmies compared with some specimens of this mountain form, I must confess that the insect to which I should have referred it, were it certainly referable to a British species, would have been, as I have already stated, *loniceræ*, the large specimens of that species captured by the Rev. W. F. Johnson, near Armagh, being the nearest approach to it. Still, this apparent similarity might be due, perhaps, to an approximation in size, and it was rather the structural peculiarities presented in the shape of the fore-wings and the development of the antennæ which impressed me most forcibly with its distinctness.

After we entered the Dora Valley we did not meet with the species again for a week. Then it occurred in considerable numbers, although rather worn, on the thistles, which grew well up the Val Chapy that lies between Mont Cornet and Mont de la Saxe; some four or five miles from Courmayeur. Later, Dr. Chapman found the species high on the Crammont, and afterwards I found it in the Cogne Valley, near Champlong. Everything I observed about the species tended to confirm my previous belief, and I am perfectly satisfied, in my own mind, that *Z. medicaginis* (*dubia*) is not specifically identical with our *Zygæna trifolii*. It is, of course, a very near relative of *trifolii*, but I would impress upon you once more the fact that its affinities are still more strongly with *loniceræ*. All three species belong to the five-spotted group, and only on very rare occasions do they offer any variation from the normal number of spots.

Staudinger treats this as a variety or local race, and does not apparently know of its existence as an aberration. This, in itself, is a strong and valuable point upon my side of the question. Its restricted area, too, is very remarkable. Staudinger localises it in "the Southern Alpine Valleys, Pyrenees and, doubtfully, from Greece." How much differentiation it has undergone we can hardly say, but everything points to the fact that it has evolved through *loniceræ* rather than through *trifolii*.

But this is not the only difficulty that occurs (to me, at least) in regard to this species. Staudinger says, in his diagnosis of *dubia*, which I have before quoted, "with five or six spots on the fore-wings." Now, the large species to which I have been referring as *medicaginis* (*dubia*), and which Professor Blachier (whom I find to be an excellent authority on Alpine insects) sent me as *dubia*, has five spots, and five spots only, on the anterior wings, nor had any of the many specimens which I saw and captured, and which were evidently specifically identical with Professor Blachier's specimens

more than five; neither, indeed, had Coverdale's specimens (probably from Staudinger himself) more than five.

In the openings of the larch woods near Courmayeur, where *Zygæna carniolica*, *Z. achilleæ*, *Z. transalpina* and *Z. pilosellæ* abounded, a species occurred, the males of which appeared to be almost identical with our large British form of *loniceræ*, whilst the large females were somewhat like *medicaginis* (*dubia*). But there was one distinct and constant character in these specimens, and that was the presence of a small sixth spot (the lower of the outside pair) which, sometimes indistinct, was, nevertheless, always present. Now, it is certain that whoever closely worked over any of these Alpine valleys would be almost sure to come across these two, in some respects, similar species, the one on the open ground, the other in the openings of the larch woods, and if the two were sent to an entomologist mixed up (as they probably would be) it is more than probable that he would, judging from the superficial resemblance of both sexes, and the females in particular, consider them as one species. In no other way can I suppose how Staudinger considered *dubia* to have sometimes six spots.

This preconceived notion of mine was further strengthened by an examination of the British Museum material. There, *mirabile dictu*, and probably owing to the incorporation of Zeller's well-named insects, these two insects were correctly separated in spite of the fact that a number of this peculiar six-spotted species had been labelled *dubia* by various collectors through whose hands they had passed into the British Museum. So far as I am able to judge, on the large amount of material that I have examined, I consider *medicaginis* a purely five-spotted species and quite distinct specifically from our *trifolii*.

I may mention here that I received from Mr. Warburg some specimens of a Burnet captured at Cannes, bearing a very close resemblance to *medicaginis*. It is, however, a much more metallic insect, has a distinctly deeper coloration on both wings, an exceedingly broad black band to the hind-wings, but has, in addition, a *sixth* spot on the under surface of the fore-wings, the spot being only just visible on the upper surface. This sixth spot, as I have pointed out, is not present at all in *medicaginis*. In spite, however, of its very distinct facies, I find a specimen, caught by Homeyer at Cannes in 1878, has been placed at the bottom of the series of *dubia*, and evidently considered as such, in the British Museum collection. This is, of course, an error, the two species being very easily distinguishable.

Now, if my view be the correct one, and I have no doubt that it is, we must inquire into the proper name for this species. It would appear to be Boisduval's *charon* and Herrich-Schaeffer's *stæchadis*, but both of these names are pre-occupied by other species of *Zygæna*. It is Lederer's *medicaginis*, and Boisduval also called it by this name in his *Essai sur une Monographie des Zygénides*,

Paris, 1829, and as this specific name is not in use for any other species, it should certainly replace Staudinger's varietal name of 1861. I propose, therefore, that in future this insect be called *Zygæna medicaginis*, Bdv. There can be no doubt of the scientific inaccuracy of linking it with *trifolii*. If we do so, then all the European five-spotted *Zygænas* had better be considered as one species. I am quite aware that the term "species" is a conventional one, and its use a convenient method by which we can at once discriminate what others are speaking of, or to what they refer. But as it has a conventional usage which represents a certain rather indefinite, and yet in other ways definite, value, it is advisable to break off the unscientific connection which appears to be set up when *medicaginis* is considered as a variety of *Z. trifolii*.

Now, let us turn to the specimens themselves which I exhibit, a sample only, however, of the larger number observed. Not a trace is to be seen of the general variation to which we are so accustomed in *Z. trifolii*; neither the union of the pairs of spots nor their extension to form red blotches is to be observed. On the other hand, the spotting and markings are regular and constant, more so, indeed, than in our usually invariable *Z. lonicerae*. There is, as you will observe, a considerable amount of sexual dimorphism, the females being much larger insects, as a rule, than the males. There is a tendency, too, to form pallid spots and blotches in the red, a condition engendered probably by the exposure to which the larvæ or pupæ are frequently subject in the highland homes they haunt. At any rate, such conditions are not compatible with the most perfect reconstruction of healthy tissue after histolysis has taken place, and a tendency to produce sickly larvæ with weakly tissue and resulting in ill-formed pigment appears to be a natural sequence.

Such are the observations I have been able to string together on *Zygæna medicaginis*. As *Z. carniolica* recalls the lovely larch woods and flowery slopes of Swiss valleys, *Z. medicaginis* is interwoven in the cobwebs of my memory with the grim and rugged peaks, massive rocks, beetling cliffs and seething torrents which cut those marvellous chasms of terrific beauty and grandeur which one meets among the impressive scenery which characterises the Pass of the Little St. Bernard.

Zygæna ochsenheimeri, Zell.

By J. W. TUTT, F.E.S. Read January 10th, 1895.¹

In the favourite Burnet clearing, among the larch woods at Courmayeur, whilst the beautiful *Zygæna carniolica* and *Z. transalpina*, *Z. achilleæ* and *Z. pilosellæ* blundered about from flower to

¹ Printed here by desire.

flower, or sucked peacefully at the blossoms, a quiet species, almost overlooked, at first, on account of its comparative rarity, was occasionally to be noticed among the brilliant company. This proved the most puzzling of all our numerous captures. The males, somewhat larger than an ordinary *Z. lonicerae*, had five crimson spots and were in no way distinguishable, at a first glance, from specimens of *Z. angelicae*; but a more complete and thorough examination revealed an ill-developed sixth spot, situated somewhat closely underneath the upper well-developed spot near the apical portion of the wing. On the underside this faintly-marked spot was rather clearly developed. Paired with these were some very large females which at first reminded us somewhat of *Z. medicaginis*, but the presence of a small sixth spot, better developed than in the males, but still much less well-developed than is ordinarily the case in other six-spotted species, at once marked this comparatively rare species off as quite distinct from anything else we met with in our wanderings. The persistency and regularity with which this small spot appeared, and the constancy of its ill-developed appearance were very remarkable. At first sight one got a very decided impression that the insect belonged to a five rather than a six-spotted species.

It is well-known that all the six-spotted species of Burnet moths have a tendency to lose occasionally the lower spot of the outer pair. Such aberrations are not at all rare and denote either (1) an evolution towards a five-spotted form, if the five be a more newly-developed form than the six-spotted, or (2) an evolution towards a six-spotted form if the latter be of more recent development. They occur rather frequently among typical specimens of *Z. filipendulae* and *Z. transalpina*, but in no case do they appear to occur except as occasional aberrations.

I have pointed out, in my notes on *Z. medicaginis*, the probability of this six-spotted species having been mixed with that in Staudinger's diagnosis under the name of var. *dubia*, but it may be better to leave the final consideration of this point until later.

Among various species sent to me as *Zygæna filipendulae* var. *ochsenheimeri*, have been some veritable *filipendulae*, together with specimens of the form now under discussion. Although I have probably one of the largest collections of British Zygænidæ (excepting, of course, that of Mr. W. H. B. Fletcher) and know *Zygæna filipendulae* well, it never struck me, when capturing and observing the specimens that they had either the habits or general appearance of *Z. filipendulae*, neither did Dr. Chapman connect it in any way with that species. Much, as it would appear, in the way that doubtful European species with five spots gradually slide into what are usually considered vars. of *Z. trifolii*, so this species, owing to its resemblance to occasional aberrations of *Z. filipendulae*, has been merged into the latter. The constancy of position of the ill-developed spot and the general appearance of the insect alive

never raised a suspicion in my mind of its being *Z. filipendulæ*, although the specimens I had previously received never raised much doubt as to the accuracy of the suggested relationship. It appears to be a distinct enough species, and from its habits, etc., I have no doubt that if its earlier stages were intimately known, some other details would confirm this view. The difficulty felt by Continental collectors about it is well illustrated by the series in the British Museum, where, although they have been separated accurately enough, and this alone in the British Museum is marvelously strong evidence of the distinctness of the two, the labels of the collectors who have previously possessed them show them to have been considered as a number of different species by these different collectors through whose hands they have passed, although *Z. trifolii* var. *dubia* is probably the most general reference.

One thing appears to be quite certain to me. The specimens of *ochsenheimeri* in the British Museum collection are identical with my specimens exhibited to you to-night, and I have no doubt whatever that it is quite separate specifically from our British *Z. filipendulæ*. The position and character of the sixth spot ; its absolute constancy and the sexual dimorphism are so decided that it can scarcely be confounded with anything else. On the underside the sixth spot is very distinct. Staudinger's diagnosis is simply "var. major, saturatius rubra," true enough as far as it goes, but totally inadequate. It is "major," it is "saturatius rubra," so are many veritable *filipendulæ* when compared with others ; but these are not the salient points of differentiation. The size varies considerably, and there is an especially great difference between the sexes, and the red colour does not appear to be deeper than that of many *filipendulæ*. True, one may say that the points I emphasise are only differences of degree, and that we have not yet determined how much difference makes a species. This I readily grant, but at the same time, this moth appears to have undergone sufficient differentiation to be readily discriminated, and to breed true. It presents more constant and decided differences from *Z. filipendulæ*, for instance, than does *Z. loniceræ* from *Z. trifolii*.

The breeding true to which I have just adverted is an important point, and I have more than once emphasised its constancy of character and markings. There were no typical *Z. filipendulæ* where we found the species. Staudinger treats it as a variety, a local race, and gives as its distribution "Italy, Southern Gaul, Southern Alpine Valleys, Greece, and doubtfully from Pontus." I have kept a careful eye on the records in Continental magazines recently, and I find no instance where var. *ochsenheimeri* is recorded as taken with the type, whilst it is recorded specially by itself over and over again. Everything points to my conclusion being a correct one, and I think Zeller was quite right when, relying on his practical field experience, combined with his wonderful acumen as a student, he decided that *Z. ochsenheimeri* was a separate species.

Reflections upon Odd Rambles on the Sussex Downs.

By ROBERT ADKIN. *Read November 22nd, 1894.*

The past season has been admittedly a bad one for butterflies. Whether they were really less in number than usual, or whether the abnormal amount of sunless days prevented our meeting with them, it is difficult to decide; but whichever surmise may be the correct one, the snug corner of the Sussex Downs between Beachy Head and the town of Eastbourne, where I spent some few hours during the month of August last, appeared, with two notable exceptions, to show no exception to the general state of scarcity. These two exceptions were *Satyrus semele*, L., and *Epinephele ianira*, L. When one was fortunate enough to get a bright sunny morning, *S. semele* was sufficiently abundant along the cliff front to satisfy the most greedy hunter, flitting from flower to flower, and resting on the bare ground, as is its wont. But what becomes of all these butterflies when the sun does not shine? We have heard over and over again that they settle upon the nearest bit of bare chalk and immediately become invisible; quite true, but they cannot remain there, or our feet would disturb or kill them as we walk along the path, which is here a favourite resting-place of theirs. Nor do we see them rise from this position when the sun shines forth again after a passing cloud which has caused them all to settle. But I have noticed that when one settles it does not remain absolutely motionless, but throws itself partially on one side, often repeating the operation several times, and walks forward, keeping its wings tightly closed over its back the while; and I strongly suspect that in this way it reaches more secure shelter, not only from its natural enemies, but also from the weather, than would be afforded by the bare ground. The similarity of its colour to the soil which it affects is undoubtedly an advantage to it when settling down, but probably only temporarily so, and to enable it to reach more secure quarters for protracted sleep. The reports I had heard of the scarcity of *E. ianira* were very numerous, and were confirmed by sundry rambles through the surrounding country. I had seldom seen so few of these butterflies along the road-sides, etc., but in the sheltered hollows along the cliffs there was no lack of them; when the sun shone they were the commonest species on the wing, and in the evening rose from the grass in numbers as one passed through it and disturbed them from their slumbers. It was quite refreshing to see even the much-neglected species so abundant, but in this instance there appeared to be no tendency to any marked variation.

Colias edusa, Fb., too, I think, should be numbered among the butterflies more common than usual this autumn—at any rate, in the particular locality under notice—for, although it was not my fortune to take any large number, my want of success was occasioned by lack of opportunity on my part, rather than any difficulty

in finding the species when I looked for it. It was first noticed on 2nd September, a sunny Sunday morning, when my son saw two or three individuals disporting themselves near Beachy Head. Monday was wet, Tuesday I was in London, and on Wednesday I was not able to go in quest of them; but a specimen was seen flitting along a grassy bank within the limits of the town of Eastbourne. Thursday was, therefore, the first chance I had of making a raid upon them. Accordingly, a start was made in the direction of Beachy Head, and, on reaching the "hollows" along the cliff front, three specimens were quickly secured, but the sky becoming densely clouded further search was useless. Friday and Saturday were blank days, and, as I was due back in London on the following evening, and had not been able to satisfy myself as to whether the species was really fairly common, I was becoming desperate, when, by good luck, we woke to one of the brightest Sunday mornings that we had had during our stay by the sea, and lost no time in making a start to investigate the matter. How bright those grassy "down-sides" looked in the brilliant morning sunshine after the recent copious rain-showers, and how the few butterflies that were on the wing seemed to enjoy the genial warmth! but *edusa* thrust itself upon our notice even before these joyful scenes were reached, for, on stepping from the end of the parade on to what was once one of the snuggest bits of collecting ground in the district, but now little better than a rubbish heap, a fine male was seen, radiant in the glory of his newly-acquired plumage, flitting about the few knapweed blossoms that still remained; it really looked too beautiful to be ruthlessly slain, but I fear man's hunting instinct had the mastery of his finer feelings in this case. Continuing our ramble, we made for the "hollows" furthest from the sea front, they being the more sheltered from the wind, and soon found more *edusa*, but the edge of an ugly-looking cloud appearing over the downs, bade us look out for squalls, and seek the only shelter in the neighbourhood—a corn-rick, with a strong list to leeward; nor were we any too quick in doing so, for we had hardly nestled under its welcome cover when a driving shower swept over, drenching the herbage, which was of much heavier growth than is usual on these chalky hill sides, owing, no doubt, to recent rains. But the sun soon shone forth again, brighter than ever, making the rain-drops sparkle like diamonds on the pastures, and the butterflies to resume their gambols with redoubled energy, *edusa* being among the first to leave its shelter. But, oh! the rain, that terrible marplot to the butterfly hunter; it was down upon us again, and this time harder than ever, and however welcome the lee-side of a corn-rick may be during a shower on the open downs, such a position becomes, after a time, exceedingly monotonous; and, although the rain did eventually cease, the sun showed no disposition to show his face again, and we accordingly took discretion to be the better part of valour, and beat an ignominious retreat towards home, but not until we had satisfied

ourselves that there were plenty of *edusa* for those who were fortunate enough to have the opportunity and the inclination to go after them.

Of course there was no lack of "blues" in their special haunts; there is always an abundance of them in the sheltered nooks along the downs; it is only a matter of degree, and this summer was certainly not at the top of the scale. Of the three species frequenting the district, *Lycæna corydon*, Fb., was the most common, *L. icarus*, Rott., was almost a rarity, and, although *L. bellargus*, Rott., appeared only towards the latter part of our stay, it was never found in fresh condition, no doubt owing to the very unsettled weather prevalent at the time. Searching for varieties was quite laborious owing to the paucity of material to work upon, but it was while engaged upon this operation that a matter in connection with the resting habit of *L. corydon* came under my notice that interested me. In the hollows where the "blues" do congregate a species of *umbellifera* grows, and it is full of bud at the time when *corydon* is on the wing. These immature flower-heads are of two forms: in those that are most advanced the buds are almost white, and the spaces between them give the idea of dark spots; those that are further from maturity have a mottled brownish hue. Now, if the male butterflies always selected the most fully-developed heads to rest upon, and the females always those that are less forward, the protection afforded by the resemblance of their undersides, in each case, to the head on which they were resting would be complete, but this is not so. One frequently sees individuals of both sexes together on one head; the resemblance of the one, and the strong contrast of the other, is then very striking. I have frequently seen a female sitting on a light-coloured flower-head from a distance of at least a dozen yards, have approached, removed, and examined it before becoming aware of the presence of perhaps a couple of males on the same head, and *vice versâ*. One cannot help asking oneself the meaning of it. I pondered much upon it, and the conclusion I arrived at was that, although the butterfly, when about to rest, seeks the flower-heads by reason of some natural instinct, it has no means of discriminating between the light and dark-coloured heads. *L. icarus* is seldom found on these flower-heads, but appears to find suitable protection among the masses of dry grass stems, and is, indeed, a difficult object to detect seated upon them as they wave to and fro in the gentle breeze.

Of the other butterflies there is little to be said. *Vanessa cardui*, L., which, from the appearances in early spring we had some reason to expect would be common in the autumn, was by no means so. I probably did not see half a dozen individuals during my stay at Eastbourne. *V. urticae*, L., was to be seen occasionally rejoicing in the brief gleams of sunshine, but not an example of either *V. io*, L., or *V. atalanta*, L., was observed. *Polyommatus phlæas*, L., so abundant here last autumn, was this year quite scarce, and *Cænonympha*

pamphilus, L., was but little more common, while *Pieris brassicae*, L., and *P. rapae*, L., were notable rather by reason of their scarcity than on account of any unusual abundance.

Among the moths that might be observed by day, for I did no night work, *Plusia gamma*, L., was probably the commonest, but there was certainly no unusual number of them to be seen. Some other species that used to be very common in the neighbourhood appear to have ceased to exist there, or, if still keeping a foothold, to occur only in greatly reduced numbers; but probably the cause is rather the hand of man than any natural agency. When I first remember Eastbourne, the half mile west of the Wish Tower had a sea front of sloping cliff, thickly overgrown with innumerable chalk-loving plants, and was a very paradise for the entomologist. This was some years ago converted into a series of parades and roads, the banks between them being planted with tamarisk (*Tamarix gallica*, L.), etc. The conversion did not, however, appear to have any very great effect in diminishing the number of several of the species at first, for the parades were but little used, and no great care was bestowed upon the shrubs that had been planted, and, as a consequence, a fair crop of the "native weeds" continued to flourish, and afforded food and shelter for the various insects that affected the locality, but this state of things is now altogether altered, the parades are a favourite resort of townsfolk and visitors alike, and a whole army of gardeners appear to spend their existence on the banks hoeing up every green thing except the shrubs that they themselves have planted. One of the commonest, perhaps the commonest, species that haunted this particular spot in the good old days was *Stenia punctalis*, Schiff. It was to be found in abundance throughout the months of July and August, and even into September. On the parades being made its numbers perceptibly diminished, or it would, perhaps, be more correct to say that its range became more restricted, being confined to a small portion of ground at the extreme end of the parade, but it appears now to have entirely disappeared from the district. In 1891 I made a careful search for this species, and was rewarded by the capture of a single wasted specimen; but, although over the ground repeatedly both in 1893 and the present year, I altogether failed to find a trace of it. *Acidalia marginipunctata*, Goze., appeared to increase in numbers for a time after the alterations, possibly on account of the stone-work of the banks affording a beneficial, though artificial protection to the imago; but during the last three years the decrease in numbers has been very striking, probably not a score of individuals coming under my notice this year—not from any want of observation on my part, for a daily search was made. I attribute this continuing thinning-down of the species to the watchful care of the gardeners entirely. One cannot help feeling a certain sense of regret at the disappearance of species that have become to be regarded almost as old friends; but on the borders of a large and growing town such things are inevitable, and

it is a consolation to know that in this particular district there are many miles of downland with which the ruthless hand of the builder is unlikely to meddle, and which contain many sheltered nooks and corners where, for aught we know, some of our apparently lost species may yet retain a foothold, and which may even contain other species as yet unknown to the district.

A Morning's Sport near Rockhampton, Queensland, Australia.

By W. F. WARNE. Read February 8th, 1894.

On Easter Saturday (April 16th, 1892) finding myself with a morning to spare, I started for my first ramble in the Queensland Bush on a lepidopterous expedition.

With apparatus very rough and ready, it was not long before I wished I had two or three hundred nests of boxes with me. Seeing the uselessness of catching more than I could possibly carry without damaging the specimens, I confined myself to obtaining one or two of each of the different species I noticed, and the following is the record of about an hour and a half's work within a limited space of two or three hundred yards.

The first capture was a small yellow butterfly, *Terias smilax* (?), which was plentiful, but as it was flying over boggy and marshy land I did not trouble much about it. The next insect was a male of the magnificent *Papilio erectheus*, called by bushmen the king butterfly. In catching it I felt some of the enthusiasm of a young collector getting his first *Apatura iris*; netting it was one thing, but killing it with my cyanide bottle (a rather small one) was a much more difficult operation.

I had now arrived at a spot known locally as the "Orangery," and had been directed to a corner of the enclosure that was bounded by a fairly wide stream, there very shallow. On the way I netted what I took for an ordinary "blue," but afterwards found to be *Lycæna bætica*. Then *Deiopeia pulchella* came to destruction. I had taken a specimen of this species a few evenings before, as it was sprawling about in the wet on the counter of the bar of the hotel I had just arrived at, at "Charters Towers" (of gold mining fame). I remember being amused at the look on the barmaid's face when I carefully put the moth into an empty matchbox I had with me, before even asking whether I could have a room for the night. By this time I had arrived at the corner, and shall never forget the sight: a small flowering shrub with, I think, white bloom, shaded with pink or mauve, was attracting hundreds of insects. I quickly caught *Hypolimnias bolina*, *Eurycus cressida*, *Danais*

archippus, *D. (Linnaeus) chrysippus*, *Catopsilia catilia*, *Callidryas lactea*, *C. flava*, *C. gorgophone*, *Papilio sarpedon*—a lovely object on the wing—and then wasted some time trying to get a good specimen of *H. bolina*, which was very plentiful, but evidently nearly over. The wonderful effects of the strong sunlight on the beautiful iridescent blue rings of this insect are past description. I noticed several of the hawk moths, and took two or three specimens. A black and white moth with a golden-brown tuft of hair at the tip of the tail, *Agarista donovani* (?) was likewise very abundant. I took also a moth rather resembling *Catocala fraxini*, but with a pale shiny yellow band on the under-wing, and not so finely mottled on the upper-wing, *Achæa* sp.?

The most abundant insects seemed to be *Acræa andromache* and *Eurycus cressida*, then *H. bolina*. *D. archippus* was not so numerous, in the bright sunlight it looked like a flash of red as it darted by. Its flight was very rapid, but it struck me as keeping a very straight course. Of *D. septentrionis* I took three specimens.

In addition to the shrub mentioned, the Australian wall-flower (local name) seemed very attractive. Being what is known in Australian lingo as a "new chum," I still had the fear of snakes about me, consequent on the tales one is forced to listen to, and so confined my ramble to a very beaten track. I waded the stream for some little distance, and noticed several *Papilio eretheus*, but only obtained one other specimen.

Returning the same way home I captured what I am since told on good authority is one of the genus *Teracolus* (*Theogone*?), although Kirby's Catalogue up to 1877 does not record the genus as occurring in Australia, nor does the Natural History Museum report any. Also *Euplæa corinna*, *Vanessa itea*, *Terias hecate*, and a small dark brown butterfly I do not know the name of.

Junonia orithyia I had noticed on my way to the corner flying round and round an absolutely bare plot of ground, between two or three big trees on either side of the bush track; returning I saw the same insect, a damaged specimen, and it seemed to be attracted to a puddle of water, and was flying low down in a circle, I struck at it several times before I succeeded in capturing it, but it always returned to the same spot despite my attacks.

Altogether I came away with over thirty species, but unfortunately several of them I cannot record, as the next morning I found some ants had penetrated into my collecting tin, which was carefully packed in the middle of a compressed cane travelling trunk, and wrapped round with several woollen garments. To my sorrow several insects which I was not then in a position to identify, were rendered quite useless.

The Rhopalocera of the Indian Territory in 1893-4.

By W. MANSBRIDGE, F.E.S. *Read December 13th, 1894*

The species of Lepidoptera noted in this paper were collected in the Cherokee and Osage nations of the Indian Territory in the spring of 1893 and of 1894.

The district worked was a tract of country about 50 miles by 30, consisting entirely of prairie land. My headquarters were at Sequoyah, in the Cherokee nation, from whence, as a centre, expeditions were made in every direction, chiefly south and west.

It is not necessary to make more than a passing allusion to the character of the country, since I suppose there are few who are not familiar with the aspect of the prairie lands, so much has been written of them from time to time.

The North-west, and, indeed, almost the whole of the Indian Territory, is famed as being the most beautiful country of its kind in the whole of the United States. And not without reason is it worthy this reputation. These prairies are pre-eminent examples of the variety known as "rolling," from the resemblance they bear to gigantic waves, extending as they do for hundreds, even thousands, of miles.

These prairies are very fertile by reason of the numerous creeks that intersect them every few miles, and in spring every little hollow between the undulations has its streamlet, where the verdure is richer and more abundant, until the hot sun dries up the moisture.

The larger creeks support a belt of timber which varies in width, from a few hundred yards to several miles, according to the amount of moisture in the soil which enables the trees and undergrowth to withstand the effect of the prairie fires.

Were it not for these fires the prairie would be a vast forest—at any rate in this region—but the fires occurring as soon as the grass is dry enough to burn, effectually confine the woods to the moist areas bordering the creeks and rivers. I have seen many trees on the outskirts of the timber scarred by fire, and here and there one which, less protected than its fellows, had been "ringed" by the flames and thus killed. Every spring vast numbers of seedlings can be seen on the high prairie, but they come up only to be killed by the first visitation of this scourge of these immense meadows.

Judging only by the aspect of the land in spring—the rich grass and varied foliage of the woods, the hundred flowers of tree and herb,—the visitor, on entomological thought intent, might well consider it a land of promise; but it is promise of short life. As the weeks go rapidly by—one might almost say days—he will see that the grass will be burnt up by the scorching sun and the flowers will disappear, except some few species that seem to be able to stand anything in the way of climate, and for weeks together there will be no butterflies to tempt the collector out of the shade.

The boxes I have brought to-night contain examples of every species of Rhopalocera that I was able to find in a period of six months, which includes two springs in every way normal as to climatic conditions.

Grandest of all the butterflies of this region is *Papilio turnus*, of which I only secured seven specimens—one in May, the remainder early in July. I also saw the species at St. Louis in September. It is distributed generally over the Eastern States, but I do not know of its capture farther west than Kansas.

The solitary example of *Papilio cresphontes* in my box I captured on flowers in July.

Papilio asterias and *P. philenor*, are the commonest butterflies in the Indian territory, excepting only *Danaïs archippus*. Appearing early in April, probably a first brood, *P. philenor* is a very conspicuous insect as it flits over the herbage or rests for a moment on the low flowers, and it is tolerably common in both sexes until the middle of May, then there is a lapse until the second brood comes out in company with *P. asterias* in the early part of July, when both species are very abundant; both insects can be easily taken from the flowers, but when alarmed they fly quicker than any other butterfly I have ever seen.

I shall not easily forget the appearance a patch of ironweed presented every day for about three weeks in July; this plant is allied to our common knapweed, and grows as high as a man, in extensive patches on the "bottom" lands, and the butterflies swarm to it. The bit I have in mind is situated on the edge of a wood, where it is sheltered from the wind, which is always high on the open prairie. Here *P. philenor* and *P. asterias* were in hundreds,—although the ironweed was only about a couple of hundred square yards in extent, and occasionally a *P. turnus* and *P. ajax* lent an exciting feature to my hourly visits. Scores of *Euptoieta claudia* and *Danaïs archippus* were also on the scene, together with the smaller species such as *Eudamus bathyllus* and *E. tityrus*, the small blues, and skippers; a few *V. atalanta* and *V. interrogationis*, and the pretty *Phyciodes tharos*, var. *morpheus*, with rarely a hawk-moth or the American humming-bird moth, *Hemaris thysbe*. Most of the butterflies were so engrossed that I could take them between my finger and thumb, thus I was able to select the very finest examples for the collection. The sight was charming, and I used to go out merely to watch these magnificent insects flying round the flowers. If insects had always been as abundant I should have indeed done well; but it was only just at that time, and even then the list was limited.

Perhaps the greatest favourite of all is *Papilio ajax* of the long tails; its easy graceful flight always at the same distance above the ground is just slow enough to let the collector see the full beauty of its delicate colours—as if it were aware of its beauty, and wanted admiration. This species also is taken occasionally

in May and June, but is most abundant in the hot days of July and August.

Pieris protodice is the "white" par excellence of the Indian territory, and the larva feeds like its congener, *P. rapæ*, upon the cruciferous plants of the garden. Of the latter, I only have one specimen from the Indian ground, which I bred from a pupa found on cabbage. At St. Louis, however, *P. rapæ* is common, though not the pest it is in the Eastern States and Canada. *P. protodice* is most abundant in July, but is met with practically all the summer.

Colias eurytheme. Here we have a bone of contention. British Lepidopterists say they cannot see any difference between this insect and *C. edusa*, and until I had actually compared my series of *eurytheme* with *edusa*, I was of the same opinion. On a close examination, I think that they are distinct will be patent enough.

In my box will be seen examples of *eurytheme* of the spring brood, occurring at St. Louis in the latter part of April and beginning of May, according to the season, the variety corresponding to our *var. helice* will be noticed here. But it is the summer brood which is likely to be confounded with *edusa*; my specimens are all from Sequoyah in the middle of May, the normal time of emergence of the second brood in this southern locality. I did not collect the female, though I afterwards observed it common with the late males. There is also a series of the summer form from Mexico, males and females, which shows little difference from my Sequoyah specimens. Lastly, there are three specimens taken at St. Louis in September, when the species literally swarmed. The male is of the spring form, while the females favour the summer variety. One female is curious as showing an intermediate colouring between the spring and summer forms. A series of ordinary *edusa* is included in the box for comparison.

Turning to the summer brood the following marked differences will be noticed:—The American insect has the costal margin always lemon yellow in both sexes, and there is less black powdering on the inner margin of the secondaries giving a paler appearance to this region; also the black borders of the primaries are more strongly sprinkled with yellow than we find in our *edusa*, and the nervures are carried right through; the black discoidal spots are smaller than is the case with *edusa*. These characters are more strongly marked in the Mexican specimens. *Edusa*, on the other hand, is decidedly an orange insect, the only parallel var. that I know of being the form *helice*, which is common to both species; also it is a more robust insect, but there is no need to particularise since everyone knows *edusa*. It should, moreover, be borne in mind, when coming to a decision as to the identity or otherwise of these two allied species that American Lepidopterists are able to breed their insect since it is so common, and thus study the early stages. I believe the larvæ feed on clover, and I have seen the females in the act of ovi-positing on the common *Trifolium medium*.

Of *Meganostoma cæsonia* I only captured one specimen, unless a doubtful insect is a female of this species. The genus *Terias* is represented by two species, *T. lisa* and *T. nicippe*. Of habits similar to *Colias*, they may easily be mistaken for *eurytheme* when on the wing. These two species were not common, and could be seen from May to July.

The fine fritillary *Euptoieta claudia* was abundant in July, while early specimens were taken in June. It is a flower-loving species, and is usually abroad very early in the day—the first being observed soon after five a.m.

Phyciodes tharos is another interesting species showing seasonal variation. The spring form is larger and darker than the summer form; but it is chiefly different on the underside, which, in spring, is dark with pearly markings, and in summer ochreous, with no nacreous spots. The insect is very abundant, and I have a long series. It occurs in April, and again in June and July.

There is also a larger species of *Phyciodes* found only in woods, of which four examples are shown.

Anœia andria. This fine insect is abundant in July, and is interesting on account of its resemblance, when at rest, to a dead leaf; this is especially noticeable in spring when the hybernated females are flying—you startle one up as you walk along, and attracted by the glowing copper of the upper surface, you stalk it and watch it settle; you keep your eye on the exact spot, and it is impossible to see it until it moves. When the emergence occurs in summer it flies madly in the hottest sun, and has a special fondness for pitching on an old grey fence, or on peach trees; and if disturbed will come again and again to the same spot, so that if you miss it at one stroke you have only to wait, and as often as you are disappointed, it will return.

The *Vanessidæ* are represented by five species. *Vanessa antiopa* of course, *V. atalanta*, which, I believe, bears the same name in the United States as in Europe, although the specimens are usually smaller and duller than those taken in Britain. *V. interrogationis*, var. *umbrosa*, is fairly common in June and July; the hybernated females appearing in April. *Pyrameis huntea* is very abundant all the spring and summer, and especially so in July; and I saw *P. cardui* in St. Louis in September. The beautiful American peacock-eye, *Junonia cœnia*, was only seen on four occasions, which resulted in three captures. *Libythea backmanni*, with its long palpi, was abundant in the stable-yard, where there was a little moisture.

Everyone is familiar with *Danaïs archippus*, taken along our south coast a few years back, and catalogued under the name of *Anosia plexippus*. It has been seen in the Indian territory in immense swarms at the time of its annual migration; it is always common, and so bold you can take it in your hand.

Satyrus alope is common about the middle of July, as also is

Neonympha eurytris in woods. *Apatura celtis* is also an abundant species, and is easily captured at wet places in the creek-beds.

Chrysophanus americana is another butterfly which has caused much wordy warfare; we call this insect *C. phlæas*. I examined the American insect side by side with reputed English examples in the New York Natural History Museum, but could not detect the slightest difference. One example in my box, however, captured in September at St. Louis, is much larger than the spring brood; but I am not certain of the identity of this particular example. I cannot see any difference between the series in my box and the normal British I have put in for comparison, except that the *americana* are not shot with blue on the secondaries.

Among the blues, *Lycæna comyntas* and *L. isola* were abundant everywhere, but were usually found in the neighbourhood of ditches, manure heaps, and the creek-beds, in fact, wherever there was a damp place; these two species occur from April to October, and, as with most of the common butterflies, no distinct break occurs between the broods, perhaps some weeks they are more numerous than others, but you can always find them in fresh condition. *L. pseudargiolus* was not common at Sequoyah. One other *Lycæna* fell to my net in fair numbers, but its identity is not yet established, together with three species of *Thecla* which also have not yet been named.

The fine insect, *Eudamus tityrus*, was abundant in two well-marked broods, the second emerging in July seems to be continuous for the rest of the season. *E. bathyllus* was also a common butterfly occurring on flowers in company with *Nisoniades persius*, an insect somewhat resembling our *N. tages*, but about twice as large. I was fortunate enough to capture long series of several species of Hesperiidæ, but, unfortunately, with the exception of *Pamphila huron*, I have not been able to name them with certainty. In conclusion, my thanks are due to Mr. L. O. Howard, U.S. Entomologist, for his courtesy in naming such insects as I was able to submit to him.

LIST OF MEMBERS

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Chief subjects of Study:—*h*, Hymenoptera; *o*, Orthoptera; *he*, Hemiptera; *n*, Neuroptera; *c*, Coleoptera; *d*, Diptera; *l*, Lepidoptera; *ool*, Oology; *orn*, Ornithology; *r*, Reptilia; *m*, Mollusca; *cr*, Crustacea; *b*, Botany; *mi*, Microscopy; *e*, signifies Exotic forms.

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YEAR OF ELECTION.

- 1886 ADKIN, B. W., Brandon House, Morden Hill, Lewisham, S.E.
l, *orn*.
- 1882 ADKIN, R., F.E.S., *Hon. Treasurer*, Wellfield, 4, Lingard's Road, Lewisham, S.E. *l*.
- 1891 ANDERSON, R. J., Suez.
- 1895 ASHBY, SIDNEY R., 8, Canterbury Terrace, Maida Vale, N.W. *l*.
- 1888 ATMORE, E. A., F.E.S., 48, High Street, King's Lynn, Norfolk. *l*.
- 1888 AULD, H. A., 31, Belmont Hill, Lee, S.E. *l*.
- 1887 BARCLAY, F. H., F.E.S., Leyton, Essex. *l*, *orn*, *palæontology*.
- 1884 BARKER, H. W., F.E.S., 147, Gordon Road, Peckham, S.E. *l*.
- 1887 BARREN, H. E., 46, Lyndhurst Road, Peckham, S.E. *l*.
- 1889 BARRETT, C. G., F.E.S., *Vice-President*, 39, Linden Grove, Nunhead, S.E. *l*, *m*.
- 1895 BEAUMAN, K., 18, Victoria Road, Clapham Junction, S.W. *l*.
- 1889 BEAUMONT, A., F.E.S., The Red Cottage, Pond Road, Blackheath, S.E. *l*, *c*, *orn*.
- 1888 BENNETT, W. H., 11, George Street, Hastings. *h*, *c*.
- 1893 BILLINGHURST, H., 35, Granville Park, Lewisham, S.E. *l*, *c*.
- 1888 BILLUPS, P. C. C., M.D., 24, Shepherd Street, New Swindon.
mi.
- 1877 BILLUPS, T. R., F.E.S., 20, Swiss Villas, Coplestone Road, Peckham, S.E. *h*, *o*, *c*, *d*, *he*.
- 1892 BLACHFORD, J. V., M.B., M.R.C.S., Bristol Asylum, Fish Ponds, near Bristol.
- 1893 BOND-SMITH, W., Potton, near Sandy, Beds. *l*.
- 1887 BRIGGS, C. A., F.E.S., Surrey House, Leatherhead, Surrey.
l, *m*, *n*, *o*, *British fishes*.

YEAR OF
ELECTION.

- 1887 BRIGGS, T. H., M.A., F.E.S., Surrey House, Leatherhead. *l*.
- 1891 BRIGGS, H. MEAD, 17, St. George's Place, Canterbury, Kent. *l*.
- 1890 BRIGHT, P., F.E.S., Roccabrunna, Bournemouth. *l*.
- 1890 BRISTOWE, B. A., F.E.S., Durlstone, Champion Hill, S.E. *l*.
- 1893 BRISTOWE, L. W., Durlstone, Champion Hill, S.E. *l*.
- 1895 BROOKS, W., Grange Hall, Rotherham. *l*.
- 1890 BROWN, E. W., Capt., 5, Victoria Terrace, Enniskillen, Ireland. *l*.
- 1890 BRYANT, G., F.E.S., 70, Chesilton Road, Fulham Road, S.W. *l*.
- 1890 BUTLER, W. E., Hayling House, Oxford Road, Reading. *l, c*.
- 1888 CANSDALE, W. D., F.E.S., Sunny Bank, South Norwood, S.E. *l*.
- 1889 CANT, A., F.E.S., 10, Chandos Street, Cavendish Square, W. *l*.
- 1886 CARPENTER, J. H., Johnson Villa, Gleneagle Road, Streatham, S.W. *l*.
- 1877 CARRINGTON, J. T., 1, Northumberland Avenue, W.C. *l, cr*.
- 1872 CHAMPION, G. C., F.Z.S., F.E.S., Heatherside, Horsell, Woking, Surrey. *c*.
- 1872 CHANEY, W. C., 32, Stroud Road, Woodside, S. Norwood, S.E. (*Hon. member*). *h, l, c*.
- 1888 CHITTENDEN, D., Willesboro' Lees, Ashford, Kent. *l*.
- 1887 CLARK, J. A., F.E.S., The Broadway, London Fields, E. *l*.
- 1890 CLARK, R. A., M.A., Rossall School, Fleetwood, Lancaster. *l*.
- 1888 CLARKE, A. L., 24, Estelle Road, Gospel Oak, N.W. *l, b*.
- 1879 CLODE, W. (*Life member*).
- 1884 COOK, A. E., 31, Lower Road, Rotherhithe, S.E. *l, orn, r*.
- 1884 COOPER, J. A., Sussex Villas, Harrow Road, Leytonstone Road, E. *l, orn*.
- 1891 DACIE, J. C., Mayfield, 105, Upper Richmond Road, Putney, S.W. *m, l*.
- 1886 DAY, G., F.R.M.S., 11, Chesterton Road, North Kensington, W. *orn, mi*.
- 1888 DAWSON, W. G., Plumstead Common, Plumstead, Kent (*Life member*). *l*.
- 1889 DENNIS, A. W., 48, Mansfield Street, Kingsland Road, E. *l*.
- 1890 DENNIS, G. C., F.E.S., 39, Blossom Street, York. *l*.
- 1891 DEWEY, A. E., 35, Moore Park Road, Walham Green, S.W.
- 1890 DOBRÉE-FOX, Rev. E. C., Castle Moreton Vicarage, Tewkesbury. *l*.
- 1884 DOBSON, H. T., F.E.S., Douglas Villa, Acacia Road, New Malden, Surrey. *l, orn*.

YEAR OF
ELECTION.

- 1884 DOWNING, J. W., F.E.S., 59, Lupus Street, Pimlico, S.W. *l*.
- 1886 DUNNING, J. W., M.A., F.L.S., F.Z.S., F.E.S., 4, Talbot Square, W. (*Hon. member*).
- 1886 EDWARDS, S., F.L.S., F.Z.S., F.E.S., *Hon. Sec.*, Kidbrook Lodge, Blackheath, S.E. *l, e l*.
- 1877 ELISHA, G., F.E.S., 122, Shepherdess Walk, City Road, N. *l*.
- 1886 ENOCK, F., F.E.S., 21, Manor Gardens, Upper Holloway, N. *d, mi*.
- 1889 FARRANT, M., 74, Cambridge Street, Pimlico, S.W. *l*.
- 1887 FARREN, W., F.E.S., 14, King's Parade, Cambridge. *l*.
- 1894 FELL, FRANCIS, 21, Whitehall Road, Anerley, S.E. *l*.
- 1888 FENN, C., F.E.S., Eversden House, 83, Burnt Ash Hill, S.E. *l*.
- 1888 FENTON, F. E., F.R.C.S., M.R.C.P., F.I.Inst., Langstone, Ealing, W.
- 1872 FICKLIN, A., Norbiton, Surrey. *l*.
- 1891 FILER, F. E., 58, Southwark Bridge Road, S.E. *l*.
- 1887 FITCH, E. A., F.L.S., F.E.S., Brick House, Maldon, Essex. *l, c, hy*.
- 1887 FLETCHER, W. H. B., M.A., F.E.S., Fairlawn House, Worthing, Sussex (*Life member*). *l*.
- 1889 FORD, A., Glen Mount, 107, Braybroke Road, Hastings. *l, c*.
- 1891 FORRESTER, A. C., 99, Endlesham Road, Balham, S.W. *l*.
- 1889 FORTUNE, R., Ravensgill, Franklin Mount, Harrogate. *orn*.
- 1886 FREMLIN, H. S., M.R.C.S., L.R.C.P., F.E.S., Mereworth, near Maidstone, Kent. *l*.
- 1886 FROHAWK, F. W., F.E.S., 39, Dornton Road, Balham, S.W. *l. orn, r, gen. zoo*.
- 1895 FURNEAUX, W., F.R.G.S., 49, Omany Road, New Cross, S.E. *l, pond life, gen. zoo*.
- 1889 GERRARD, V., 69, Dunsmure Road, Stamford Hill, N. *l*.
- 1884 GIBB, L., 148, St. James Street, Montreal, Canada (*Life member*). *l*.
- 1885 GOLDTHWAITE, O. C., F.E.S., Meadow Side, Edinburgh Road, Carshalton, Surrey. *l*.
- 1889 GREENE, Rev. J. G., M.A., F.E.S., Rostrevor, Apsley Road, Clifton, Bristol. *l*.
- 1893 HALL, A., 16, Park Hill Rise, Croydon, Surrey. *l, e l, ool*.
- 1888 HALL, A. E., F.E.S., Norbury, Sheffield. *l*.

YEAR OF
ELECTION.

- 1884 HALL, T. W., F.E.S., *President*, Stanhope, The Crescent Croydon, Surrey. *l*.
- 1891 HAMM, A. H., 24, Hatherley Road, Reading. *l*.
- 1892 HARRISON, A., F.C.S., Thames Sugar Refinery, Silvertown, E.
- 1887 HAYWARD, H., 53, Fenwick Road, Peckham, S.E.
- 1884 HELPS, J. A., Newstead Lodge, 91, Wood Vale, Forest Hill, S.E. *l*.
- 1886 HENDERSON, J., *Vice-President*, 24, Birchin Lane, E.C. *l, orn*.
- 1878 HICKLING, G. H., Landon Cottage, Elm Road, Sidcup. *l*.
- 1890 HILL, H. A., F.E.S., 4, Rosslyn Gardens, Hampstead, N. *l*.
- 1888 HILLMAN, T. S., F.E.S., Eastgate Street, Lewes, Sussex. *l*.
- 1889 HINCHLIFF, Miss K. M., Worlington House, Instow, N. Devon. *l, el*.
- 1890 HODGES, A. J., 2, Highbury Place, Islington, N. *l*.
- 1888 HOPKINS, H. E., 153, Camden Grove North, Peckham, S.E. *l*.
- 1889 HORNE, A., 52, Irvine Place, Aberdeen. *l*.
- 1889 HOWGRAVE, W., 56, Granville Park, Lewisham, S.E. *l*.
- 1886 JÄGER, J., 180, Kensington Park Road, Notting Hill, W. *l*.
- 1887 JENNER, J. H. A., F.E.S., 4, East Street, Lewes, Sussex. *l, c, d, m, b*.
- 1884 JOBSON, H., 1, Rock Villas, Maynard Road, Walthamstow, E. *l*.
- 1894 JONES, Rev. W. CORDEN, Wroxall House, 162, Barry Road, East Dulwich, S.E.
- 1886 KANE, W. F. DE V., M.A., F.E.S., M.R.I.A., Drumreaskie House, nr. Monaghan, Ireland. *l, m, marine invertebrata*.
- 1887 KEAYS, A. M., A.S.T.E., M.S.A., Wandle Cottage, Croft Road, Sutton, Surrey.
- 1887 KEDGLEY, C., Hibernia Chambers, Borough, S.E.
- 1887 KELSALL, Rev. J. E., East Boldre Vicarage, nr. Southampton. *orn, r*.
- 1884 KENWARD, J., Rosslyn, New Eltham, Kent. *l*.
- 1888 KNIGHT, E., 1, Phoenix Villas, Devonshire Road, Merton, S.W.
- 1894 LAMB, H., Lime Villas, Bower Street, Maidstone. *l*.
- 1892 LARKIN, J. W., 48, Buckleigh Road, Streatham Common, S.W.
- 1894 LAWRENCE, H. B., 1, Derwent Road, Anerley, S.E. *l*.
- 1889 LEGROS, A. V., 57, Brook Green, Hammersmith, S.W.
- 1889 LEMMON, C. H., 129, Hawkstone Road, Rotherhithe, S.E.
- 1884 LEVETT, C., 107, Brockley Road, S.E. *l*.

YEAR OF
ELECTION.

- 1872 LUBBOCK, The Right Hon. Sir JOHN, Bart., M.P., D.C.L.,
F.R.S., F.L.S., F.G.S., F.E.S., etc., High Elms, Down,
near Farnboro', Kent (*Hon. member*). *h, b.*
- 1890 MCARTHUR, H., 35, Averill Street, Fulham, W. *l.*
- 1872 M'LACHLAN, R., F.R.S., F.L.S., F.Z.S., F.E.S., Westview,
Clarendon Road, Lewisham, S.E. (*Hon. member*). *n.*
- 1889 M'LACHLAN, W. H., 70, Croxted Road, West Dulwich, S.E. *l.*
- 1892 MAIN, H., Thames Bank House, East Greenwich, S.E. *l.*
- 1886 MANGER, W. T., F.E.S., 100, Manor Road, New Cross, S.E.
l, c. cr.
- 1889 MANSBRIDGE, W., F.E.S., 9, The Green, Stratford, E. *l.*
- 1888 MARSHALL, A., The Caxtons, Knebworth, Herts. *l.*
- 1885 MERA, A. W., 1, Lothian Villas, Capel Road, Forest Gate, E. *l.*
- 1881 MILES, W. H., F.E.S., The New Club, Calcutta, India. *mi, b.*
- 1888 MITCHELL, A. T., 5, Clayton Terrace, Gunnersbury, W.
- 1888 MONTAGUE, C. J., Temple Chambers, Falcon Court, Fleet
Street, E.C.
- 1880 MONTIERO, SENOR A: DE C., F.E.S., Rua do Alacrine, Lisbon.
- 1889 MOORE, H., 12, Lower Road, Rotherhithe, S.E. *l, h, d, e l,*
e h, e d, mi.
- 1887 MORRIS, C. H., School Hill, Lewes, Sussex. *l, c, m.*
- 1887 NEVINSON, E. B., 7, Staple Inn, W.C. *l, stalk-eyed crustacea.*
- 1889 NICHOLSON, W. E., F.E.S., Lewes, Sussex. *l.*
- 1886 NUSSEY, B. L., 167, Jarvis Street, Toronto, Ontario, Canada. *l.*
- 1872 OLDHAM, C., 2, Warwick Villas, Chelmsford Road, South
Woodford, Essex. *l.*
- 1891 PALMER, J. F., Ewell Road, Surbiton Hill, Surbiton.
- 1892 PANNELL, C., East Street, Haslemere. *Conchology.*
- 1894 PEACH, A. W., 9, Holly Road, Chiswick, W. *l.*
- 1884 PEARCE, A. E., 12, Marius Road, Upper Tooting, S.W. *b.*
- 1888 PEARCE, J., 4, Borough High Street, London, S.E.
- 1883 PEARCE, W. A., 88, Croxted Road, West Dulwich, S.E. *l, b.*
- 1880 PERKINS, V. R., F.E.S., Wotton-under-Edge, Gloucestershire.
l, h, d.
- 1888 PERKS, F. P., 41, St. Martin's Lane, Charing Cross, W.C.
zoology, mi, pond life.
- 1889 PERRY, J. F., Oscott Cottage, Birmingham. *l, c.*
- 1887 PORRITT, G. T., F.L.S., F.E.S., Crossland Hall, Hudders-
field. *l.*

YEAR OF
ELECTION.

- 1888 REID, W., F.E.S., Pitcaple, Aberdeen. *l, continental l.*
- 1887 REINDORP, J., 9, Wordsworth Avenue, East Ham, E. *o, l.*
- 1887 RICE, D. J., 7, John Street, Bedford Row, W.C. *orn.*
- 1887 ROBINSON, A., B.A., F.E.S., 1, Mitre Court, Temple, E.C. *l.*
- 1893 ROBINSON, F. J., Jun., 49, Charing Cross, W.C. *l.*
- 1894 ROBINSON, L., 54, Boundary Road, N.W. *l.*
- 1888 ROBSON, H., 5, Winterwell Road, Brixton Hill, S.W. *l, b.*
- 1890 ROWNTREE, J. H., Westwood, Scarborough. *l.*
- 1887 ROUTLEDGE, G. B., F.E.S., 50, Russell Square, W.C. *l.*
- 1891 RUFFLE, G. W., 16, Coleman Road, Camberwell, S.E.
- 1887 RUSS, P., Culleenamore, Sligo, Ireland. *l.*
- 1895 RYE, B. G., 281, Fulham Road, W. *l.*
- 1891 SABEL, E., F.Z.S., F.E.S., F.R.G.S., Linton House, South Side, Clapham Common, S.W.
- 1886 SALWEY, R. E., F.E.S., Sun Gate, Hook Road, Kingston-on-Thames. *l.*
- 1888 SAUZÉ, H. A., 4, Mount Villas, Sydenham Hill Road, S.E. *l.*
- 1894 SCORER, A. G., Flaxmoor, Caston, Attleborough, Norfolk. *l, orn.*
- 1888 SHORT, A., 14, Melody Road, East Hill, Wandsworth, S.W. *l.*
- 1893 SILLAR, R. L., 44, Castle Hill Avenue, Folkestone.
- 1886 SKINNER, G., 62, Stanley Street, Owens' Road, Battersea, S.W. *l.*
- 1890 SMITH, W., 9, Hill View Place, Paisley. *l.*
- 1890 SMITH, W., 1, Denmark Villas, Albert Road, Teddington.
- 1882 SOUTH, R., F.E.S., Oxford Road, Macclesfield, Cheshire. *l.*
- 1873 STANDEN, R., F.L.S., F.E.S., Thorpe Hall, Colchester. (*Life member*). *l.*
- 1872 STEP, E., Portscatho, Cornwall, *b, m, orn.*
- 1892 STEPHENS, A. L., 6, Glen Mohr Terrace, Greenwich, S.E.
- 1872 STEVENS, S., F.L.S., F.E.S., Lcanda, Beulah Hill, Norwood, S.E. *l.*
- 1889 STURT, W. T., West House, Queen's Road, Kingston Hill. *l.*
- 1894 TARBAT, Rev. J. E., The Common, Weybridge. *l.*
- 1895 THORNHILL, W. B., Castle Cosey, Castle Bellingham, near Drogheda, Ireland. *l.*
- 1894 TRENERRY, E. H., 3, North Road, Clapham Park, S.W. *l.*
- 1873 TUGWELL, W. H., Ph.C., 6, Lewisham Road, Greenwich, S.E. *l, b.*
- 1887 TURNER, H. J., F.E.S., *Hon. Librarian and Report Secretary*, 13, Drakefell Road, St. Catherine's Park, S.E. *l, orn.*

YEAR OF
ELECTION.

- 1886 TUTT, J. W., F.E.S., Rayleigh Villa, Westcombe Park, Blackheath, S.E. *l*.
- 1887 VERRALL, G. H., F.E.S., Sussex Lodge, Newmarket. *d*.
- 1889 VINE, A. C., 38, Temple Street, Brighton, Sussex. *l*.
- 1889 WAINWRIGHT, C. J., 147, Hall Road, Handsworth, near Birmingham. *l*.
- 1880 WALKER, J. J., R.N., F.L.S., F.E.S., 23, Ranelagh Road, Marine Town, Sheerness. *l, c*.
- 1890 WALLACE, G., 6, Borough High Street, S.E. *l*.
- 1888 WALLER, R., 273, Clapham Road, S.W. *l*.
- 1886 WALSINGHAM, The Right Hon. Lord, M.A., LL.D., F.R.S., F.L.S., F.Z.S., F.E.S., etc., Merton Hall, Thetford, Norfolk (*Hon. member*). *l, orn*.
- 1890 WARD, A., 66, Richmond Road, Brighton. *l*.
- 1888 WARNE, N. D., 8, Bedford Square, W. *l*.
- 1888 WARNE, W. F., 8, Bedford Square, W. *l*.
- 1887 WATERHOUSE, E. A., 23, Spencer Road, Putney, S.W.
- 1886 WATSON, C. H., 37, Tierney Road, Streatham Hill, S.W. *l*.
- 1888 WEBB, S., Folkestone Road, Dover. *l*.
- 1872 WEST, W., *Hon. Curator*, 8, Morden Hill, Lewisham Road, S.E. *l, c*.
- 1878 WEST, W., L.D.S., Cyprus Villa, Lewin Road, Streatham Common, S.W. *l, mi*.
- 1887 WHIFFEN, W. H., 49, Granville Park, Lewisham, S.E. *l*.
- 1891 WILLIAMS, H., 30, Hanley Road, Hornsey Rise, N.
- 1888 WINKLEY, M. H., 9, Glen Eldon Road, Coventry Park, Streatham, S.W. *l*.
- 1893 WOLFE, J. J., Skibbereen, Co. Cork, Ireland. *l*.
- 1895 WOODS, H., The Old Grammar School, Ashford, Kent. *l*.
- 1886 WRIGHT, W. H., Secretary's Department, Somerset House, Strand, W.C. *l*.
- 1888 YOUNG, J. N., 85, FitzWilliam Road, Rotherham. *l*.

Members will greatly oblige by informing the Hon. Sec. of any errors, additions or alterations in the above addresses and descriptions.

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